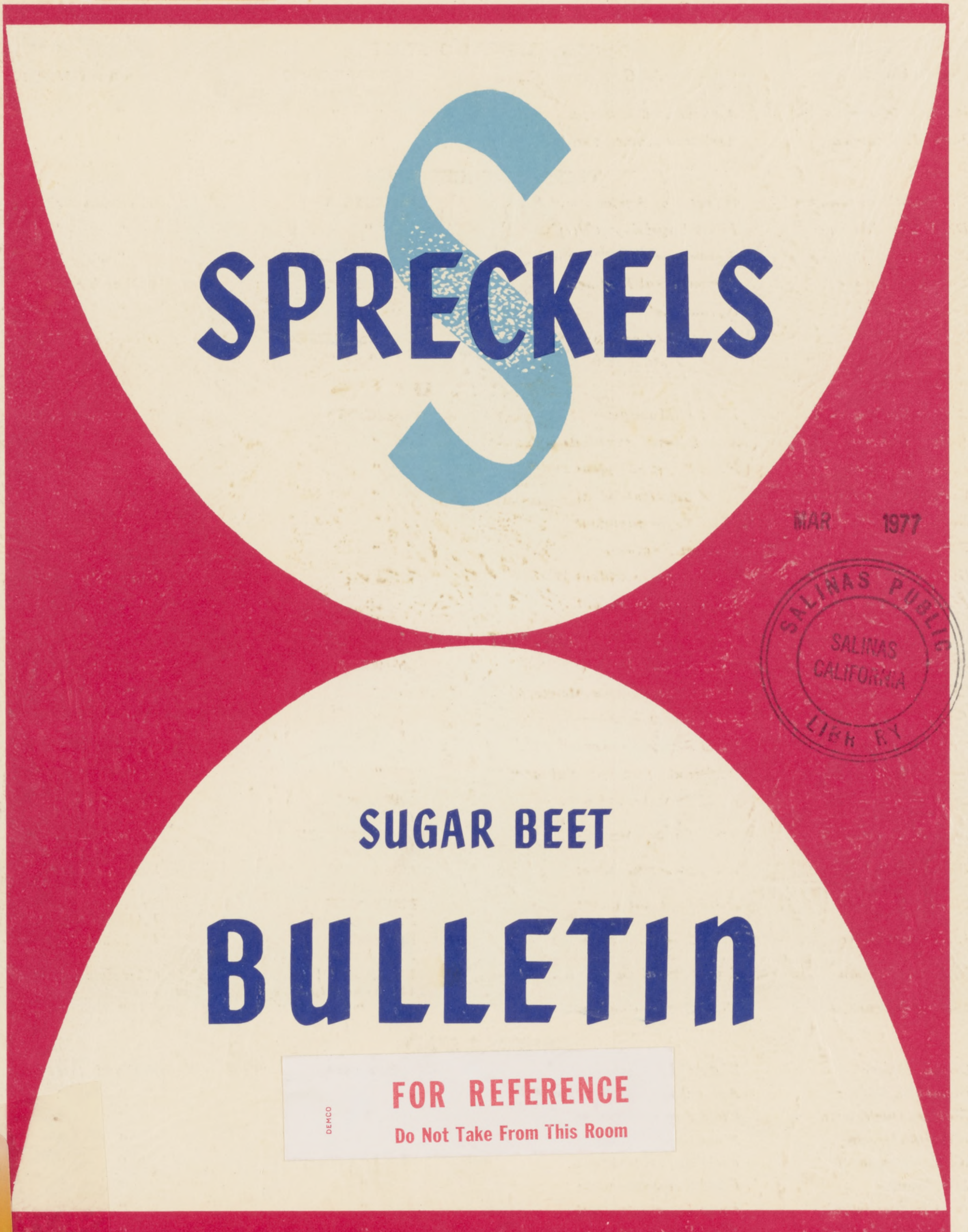

SPRECKELS

SUGAR BEET

BULLETIN

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SPRECKELS SUGAR BEET BULLETIN			
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FEB 26 '60

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

SPRECKELS SUGAR BEET BULLETIN

VOL. 24 JANUARY-FEBRUARY, 1960 NO. 1

1

THE LONG HARVEST

was only one of the past Campaign's unusual features
Spreckels factories set new records for more

TONS OF BEETS SLICED
BAGS OF SUGAR PRODUCED

than ever before in the Company's sixty two years of operation.

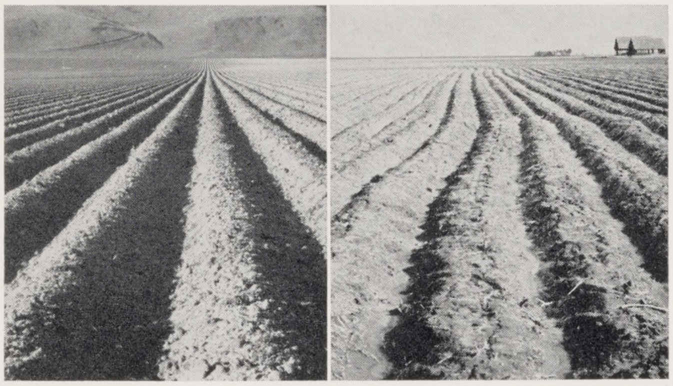
ANOTHER RECORD CROP IN 1960?

IN THE March-April, 1959 issue of the Sugar Beet Bulletin, our agronomist, Lauren Burtch, made this statement: "We have all the tools available for producing the highest tonnage in history with reasonable sugar percentages—weather permitting. The big job remains with you, the grower, to do the best possible job under the climatic conditions available for 1959".

This prophetic statement of Mr. Burtch has now become history. 1959 did indeed produce the highest tonnage in history, and with more than reasonable sugar percentages. We are mindful that the weather factor was important. But we cannot overlook the fact that the grower himself most certainly did the best possible job under the climatic conditions available. That is why a review of cultural processes which had a bearing on the record crop of 1959 is in order.

LAND PREPARATION AND FERTILIZING

In most parts of California it has become almost standard practice to start seed bed preparation by listing the field into ridges for subsequent planting, either on single row or two-row beds. If listing be considered as the first operation in seed bed preparation, it is by no means the only one. At the time of listing, it may be necessary or desirable to make a preplant application of fertilizer, or a pre-emergence application of a chemical weed killer. The decisions regarding the date of listing and what other operations are to be done at the same time is an administrative function of the grower or ranch manager, and is of great importance. But hardly less important is the skill and consciousness of the man on the tractor. Unless he has an almost fanatical enthusiasm for straight steering, he can be responsible for a constantly recurring series of difficulties throughout the following growing season. The straightness of the beds at listing time will determine the quality of subsequent planting, cultivation, thinning and harvesting operations.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PRIDE AND PREJUDICE—pride in skill of tractor driving can produce beds like those on the left. The beds on the right are prejudicial to all subsequent operations; planting, thinning, cultivating, harvest.

Fertilizing is another matter which comes under the heading of "administrative decision". We can make no general recommendations for amount, kind, or time of fertilizer application. Every field is a special case, and the experienced grower is the best judge of fertilizer needs. But beware of too much nitrogen at harvest time, the proved depressant of sugar percentage.

Our best advice is to leave a few strips in each field where nitrogen is applied at half the rate used in the rest of the field. Stewart Anderson, now Agricultural Superintendent at Manteca, has repeatedly proved the value of these half-applications. Here is one of his reports:

"There are some interesting results coming out of the half-applications of fertilizer which some of my growers put in their fields in 1959. The following are the results:

	140 Lbs. Nitrogen	70 Lbs. Nitrogen
Tons Beets per Acre	32.2	32.2
Percent Sugar	14.8	15.4

The strip in this field did not show any deficiency until harvest. Another field showed these results:

	120 Lbs. Nitrogen	60 Lbs. Nitrogen
Tons Beets per Acre	34.2	34.2
Percent Sugar	13.4	14.7

The strip in this field started to show a nitrogen deficiency about three weeks before harvest. Both fields are on the same soil type in the Linden area."

PROPER PLANTING PROCEDURE

This was the title of an article in the January-February 1959 Spreckels Sugar Beet Bulletin written by John R. McDougall. A quotation from this article seems timely.

"Soil type and the texture of the soil at planting time both strongly influence planting depths. Extremely fine seed beds look beautiful to the eye, but under conditions of heavy rains and north winds become a concrete grave for the young beet crop, especially if planted over an inch in depth. A rough seed bed is much more desirable. It won't run together under adverse weather conditions, will crumble better under rolling and will absorb more water if irrigation is necessary to moisten the bed.

"Sugar beet seedlings do not have as much strength to force their way to the surface as do other seedlings (such as cotton, beans and most weeds). Thus it is increasingly important to avoid planting too deep if an adequate pre-thinning stand is to be insured."

"See that you have the right row spacing of your planters; that you have the proper seed plates; and that your shoes or disc depth bands are uniformly at the same desirable depth. Nothing is more disconcerting than when cultivating to find most rows in

3

COVER NOTE — On January 8, 1960, storm clouds gathered at Woodland, and the steady rains which followed brought to an end a harvest of near-record length. All-time records were established for tons of beets sliced and bags of sugar produced by all three Spreckels factories. Spreckels growers produced a crop which yielded the most tons per acre in the Company's 62 year history—sugar percentages was the highest of any year since 1954. Here are the figures:

	Tons Delivered	Tons Per Acre	Percent Sugar
Spreckels	473,340	29.66	15.43
Manteca	673,252	22.75	14.84
Woodland	622,236	24.46	15.57

your field have become 'guess rows.' There is no end to 'cultivator blight' under these conditions and there is also no such thing as close cultivation. Then when harvest time rolls around you wonder where all the watergrass and weeds came from".

STATUS OF MECHANICAL THINNING

Up until 1959, mechanical thinning in California had been tried by relatively few growers. However, their pioneering efforts were closely watched, because in the spring of 1959 very definite upswing in the percentage of acreage mechanically thinned occurred. The following table shows how mechanical thinning caught on in 1959:

	Acres Thinned; Machine Plus Handhoe		Acres Thinned; Machine Alone	
District	Acres	% of Total	Acres	% of Total
No. 1, Spreckels	450	2.8	200	1.25
No. 2, Manteca	10,100	29.0	1,500	4.2
No. 3, Woodland	3,250	9.6	1,250	3.7

The mechanically thinned acres are still well in the minority, but the break-through did occur in 1959, and it is particularly significant that 1959 was a record year for yield. While the quality of mechanical thinning has been steadily improving, hand thinning has deteriorated in quality and has become both scarcer and more costly. Therefore, it is the belief of those in the Spreckels Agricultural Department that mechanical thinning must be recommended and that the threat of labor shortage in the fields should be the clinching argument in favor of adopting machine thinning in 1960.

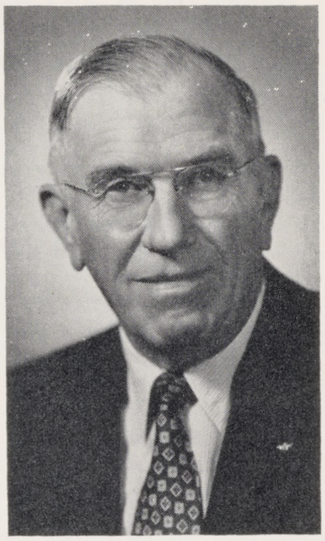
Manufacturers of thinning equipment have not been idle in their development work. The Silver Engineering Works of Denver introduced their adjustable tandem head in 1959 and it met with a very good acceptance. Now for 1960 the Silver Engineering Works has made two important forward steps in the direction of serving California beet growers. First, they have designed and put into production a California model of their thinning machine. This is a tractor-mounted ground wheel driven assembly, capable of adjusting to any row spacing from eleven inches upward. The other forward step is the formation of dealerships throughout the beet growing areas so that Silver Thinners will be sold and serviced by a considerable number of dealers.

Silver Eng. Wks. Photo 4

SILVER THINNER (Series "A," California type) is available for tractor-mounting (front or rear tool bar), or for sled-mounting. When sled-mounted, drive is from tractor rear wheel.

WEED CONTROL

In reviewing the 1959 cultural practices, two developments in weed control technique are noted. The use of pre-emergence weed control chemicals was proved to be a workable practice. It remains only for the suppliers of these chemicals to work with growers toward the end of perfecting the technique of application. A number of discussions with vendors of pre-emergence weed control chemicals point up the fact that the problems remaining are mainly those of application technique; the materials are basically effective.



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GEORGE P. WRIGHT, who was employed by the Spreckels Sugar Company for a period of 39 years passed away in the Salinas Valley Memorial Hospital on January 16.

Nearly his entire life was devoted to the sugar beet business—His early years in Colorado. During the period of his employment with Spreckels he served as District Manager in the Sacramento-San Joaquin Valley area and more recently in the Salinas Valley area. He had retired from active employment in March, 1958.

Mr. Wright's many acquaintances throughout the State's beet producing districts will feel that they have lost a close friend.

Another very important weed control technique which California may well borrow from its neighboring states of Oregon and Idaho is the spring tine cultivator. Here is a tool which can be a very important supplement to the thinning machine, making it possible to reduce labor requirements in the field which otherwise would have to do an expensive hoeing job.

HARVEST

The 1959 harvest was marked by capacity deliveries to all Spreckels Factories virtually every day of the fall harvest season. In general, the quality of harvest was greatly improved in the fall of 1959 as compared to the previous year. Part of this improved quality of beets delivered was attributable to the good crop itself, which was relatively weed free. But basically it reflects a very real improvement in harvest management by our growers—an achievement which we genuinely appreciate.

We would like to make one admonition with regard to harvest. We believe that yields can be markedly increased by paying more attention to harvesting more nearly 100% of the crop. The winter rains of early 1960 revealed an alarming number of beets and beet pieces in the fields which were harvested during the fall.

So we should like to repeat Mr. Burtch's 1959 quotation, fitting it to 1960; "The big job remains with you, the grower, to do the best possible job under the climatic conditions available for 1960".

NUTRIENT DISTRIBUTION STUDIED

By GEORGE W. WHEATLEY

Agronomist, Spreckels Sugar Company

ARE THERE SUFFICIENT nutrients in the soil to produce a satisfactory sugar beet crop? Are the plant nutrients in the soil available, both chemically and positionally, for satisfactory growth? What depth of soil will be used for obtaining plant foods in the production of a sugar beet crop?

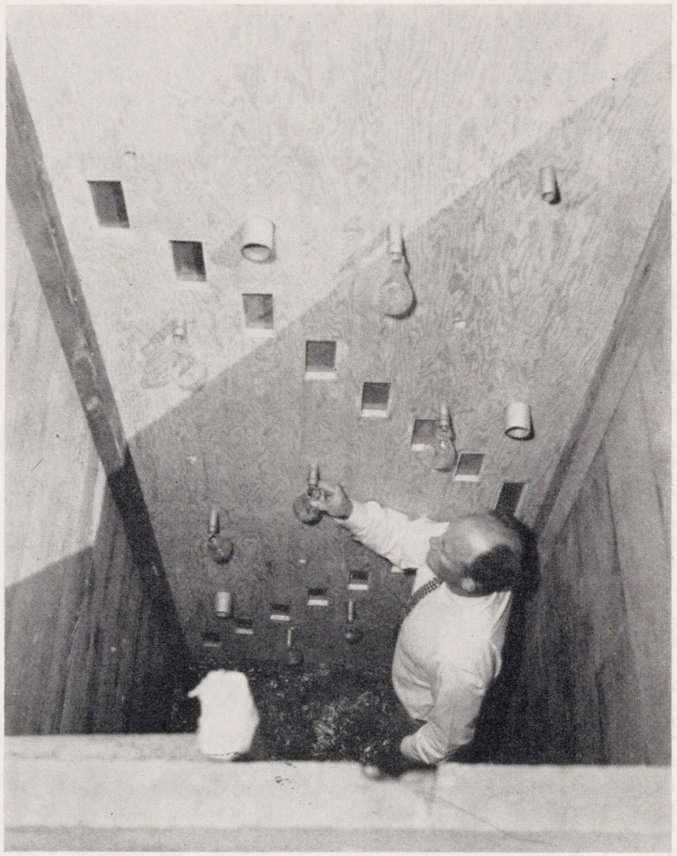
Answers to these questions would be of great benefit in more efficiently producing a beet crop. Generally, under California conditions, nitrogen is the main plant food element with which we are concerned. Nitrogen is required by the plants for growth, but available nitrogen in the soil at harvest time can seriously reduce the accumulation of sugar in the beets.

During the past several years, experimental results have demonstrated that some of our California soils are accumulating more and more residual nitrogen that has been applied to (but not used by) previous crops. This is particularly true of heavy soils and agricultural areas where other crops in the rotation receive heavy application of nitrogenous fertilizers. It has been found that some soils contain enough nitrogen after certain rotations to produce a satisfactory crop of sugar beets without any addition. The use of nitrogen in some of these fields has not only failed to show a yield response, but has actually been detrimental to the crop by reducing the sugar content, thereby making the crop worth less money.

To learn more about this residual nitrogen in the relatively heavy soils on the floor of the Salinas Valley, a study was designed, carried out, and here summarized.

To facilitate this study, a hole, four feet square and nine feet deep, was dug in a beet field at Spreckels, California. Three sides were shored up and the fourth side was framed with plywood containing glass window openings. These windows were arranged in such a manner that the beet root development could be observed throughout the growing season.

Soil samples were taken from the undisturbed soil adjacent to the soil pit at fourteen depth levels and at intervals of 30 days. Each soil sample was analyzed for moisture percent, soil PH, and nitrate nitrogen content. The soil texture was determined for each one foot depth from the first samples. The soil texture (particle size) ranged from a fine, silty clay on the surface to a fine, sandy clay at the 3-4 foot depth, then to a medium fine sand at the 12 foot depth. There were no noticeably compacted areas, nor areas of high salt accumulation in the soil profile. Observations indicate this was a well drained soil with a water table usually below the twelve foot depth. On two sample dates, one in late May and one in early July, the water table was around the eleven foot depth. Data from the samples indicate the moisture percent of the soil varies considerably from sample date to sample date. This is probably to be expected due to periodic irrigations. The moisture percent was more variable at the shallower depths than in the deeper areas, but as the plant roots penetrated deeper into the soil, moisture variation in the soil increased at the lower levels. Soil samples taken shortly after irrigations show the soil moisture, removed by plants through their root systems, had been replenished.



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LYSIMETER PIT has one side made of plywood, with glass inspection windows and water sampling tubes distributed over its area. In this photo, George Wheatley is sampling water which percolated to the 4-foot depth.

The soil had a PH of approximately 8.5 and varied only slightly with soil depth or sampling dates.

Through the glass windows, it was possible to observe the feeder root development of the sugar beets during the growing season. This development was characterized by a single, snow white thread-size root extending two to four inches beyond an increasingly thick network of fine, hairy roots. As the main branched feeder roots elongated, they increased in diameter two or three times and changed from white to an intermediate brown color, four to five inches from their growing tips. The fine, hairy, lateral roots also were characterized by white (but less elongated) growing tips.

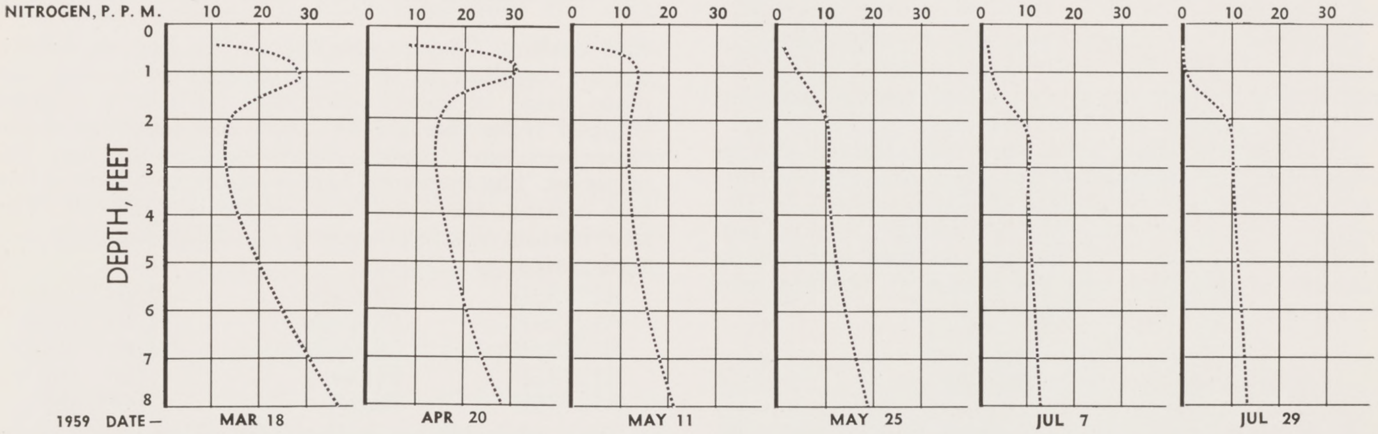
Development of main branches in the feeder root system showed as much as two inches of root elongation in 48 hours. Root development was observed from about the eight inch depth to the six foot depth. Early root growth was most pronounced in the nine to 18 inch depth, while the greatest amount of root development at beet harvest time was observed in the three to four foot depth.

Of considerable interest was the observation of sugar beet nematode (*Heterodera schachtii*) developing on the visible beet roots. This appeared most pronounced between the 8 inch and 18 inch depths.

The nitrate nitrogen content of the soil varied considerably between sample depth and also between sample dates for any given depth. However, data throughout the growing season indicates a definite nitrate nitrogen reduction in the root zone. This is particularly pronounced in the upper levels, excluding the surface one inch, where there is an increase. This supply of nitrate nitrogen in the surface inch is a result of evaporation of moisture and could be made available to plants by a rain that would move it downward into the root zone. This may suggest one reason for the usual reduction in sucrose following a rain during beet harvest.

There appears to be a large amount of new root development late in the season at the lower level of the soil. As the beet roots penetrate into the lower levels where there is more nitrate nitrogen and the moisture content is less variable, they appear to absorb this nitrogen and continue to grow into the fall at the expense of sugar content. This may be another reason for lowered sugar percent late in the season, particularly in the Coastal Valley.

Sufficient data were not obtained to determine to the extent of nitrate nitrogen loss from deep percolation of irrigation water. Continuation of this study is planned with additional test structures for observing root growth, moisture content, soil fertility, nutrient distribution in the soil profile, soil texture, and the soil PH, all in relation to the production of a sugar beet crop.



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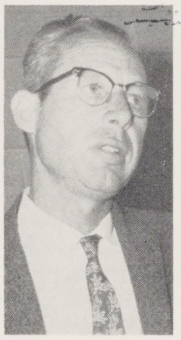
EACH CURVE indicates the vertical distribution of nitrate nitrogen in the soil profile of a beet field. As the season progresses, two effects are indicated; First, the nitrogen above the two foot level is depleted by the growing crop; second, deep percolation leaches nitrogen from the 3-8 foot zone to greater depths.

AGRICULTURAL STAFF MEETING

The Spreckels Agricultural Staff convened in Sacramento, January 12 to 15, for their annual meeting. These meetings are held each year for the purpose of acquainting staff members with the latest advances in sugar beet technology. Speakers invited from the University of California at Davis, and from the agricultural industries presented talks and welcomed discussion. Subjects covered were: Fertilizer Recommendations, Farm Labor Problems, Basic Fungicide Studies, Seed Protectants, Crop Yield Determinants, Crop Production Costs and Prices, Water Quality and Chemical Weed Control.

Spreckels executives discussed administrative policy, sugar industry trends and technical subjects embracing agronomy, genetics and plant pathology. The meeting was climaxed with a dinner, highlighted by a provocative talk on Population Trends by Professor Max Kleiber, of the University of California.

JOHN TAYLOR


LLOYD EVELAND

DR. F. J. HILLS

DR. L. D. LEACH

DR. R. S. LOOMIS

DR. T. R. HEDGES

DR. MILTON FIREMAN

EDWARD BOWLES

8

BEET PLANTER DEVELOPMENTS

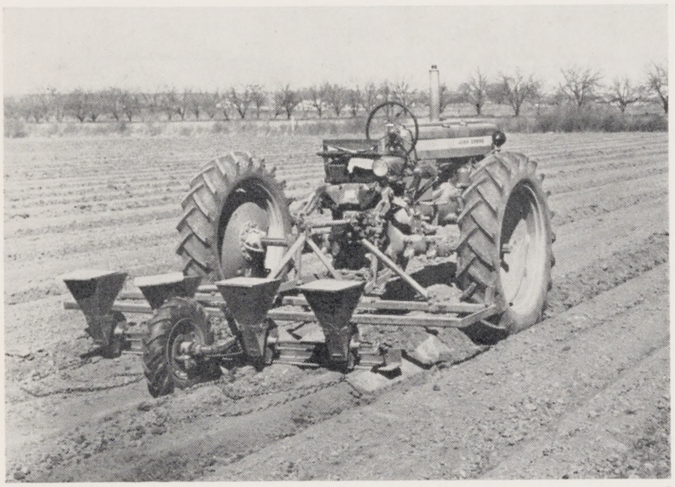
RECENT DEVELOPMENTS in beet seed planters include one completely new machine and important changes in an old favorite.

The new machine is the Mel Beck Precision Planter, built by Mel Beck, 214 North Main Street, Nyssa, Oregon. Features of the Mel Beck planter include:

1. Unit construction based upon a rear tool-bar supported bed shaper.
2. Seed-metering cup-wheels which rotate upward through the seed supply and carry one seed per cup over to the planter shoe.
3. Single ground-drive wheel for any number of planter units.
4. Any row spacing accommodated, from 12 inches to 32 inches.

The Mel Beck planter can also be supplied as a drawn sled unit, but individual planting units are not available since the design integrates the planting unit, shoe opener and bed former.

It is claimed that, unlike previous designs of cup wheel metering devices, the Mel Beck unit gives a constant seeding rate regardless of depth of seed in the hopper. This is a considerable advantage, because one of the most serious obstacles encountered in previous planters of this type was the change in seeding rate as the seed level in the hopper fell.



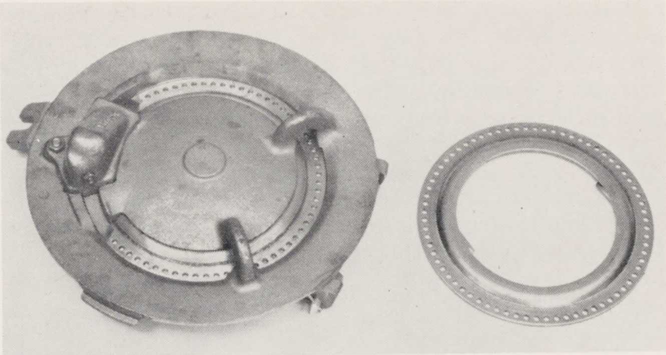
Mel Beck Photo 9

THE MEL BECK planter uses the cup-wheel principle of seed metering. It features shoe openers rigidly located in heavy steel-plate bed shapers.

CHANGES IN JOHN DEERE MODEL 70

The John Deere Flexi-planter 70 series, was the first described in the November - December 1956 Spreckels Sugar Beet Bulletin. The 70 series planters have enjoyed wide acceptance in California, and some recently announced refinements improve the planter's performance with mono-germ seed.

Mr. H. C. Johnson, Sales Manager of the John Deere Planter Works, comments on the improvements in the Flexi-planter 70 series as follows:



John Deere Photo 10

NEW HOPPER BOTTOM (B12577B) and plate (B12734B) for the John Deere No. 70 Flexi-planter. This combination will give uniform placement with minimum damage to seed as issued by Spreckels Sugar Company.

"The improvements consist of more complete machining of seed hopper parts in order to get a very close fit between the seed plate and the hopper bottom casting. The machining of the hopper bottom casting resulted in the requirements of a beet seed plate being of larger diameter. All unit planters shipped from the factory since last planting season have beet seed hoppers which require the new line of plates. The improved beet seed hoppers have a bottom casting, the number of which is B12577B. This new bottom casting requires the following new beet seed plates:

B12732B	72-Cells,	10/64″	holes
B12733B	72-Cells,	11/64″	holes
B12734B	72-Cells,	12/64″	holes
B12735B	Blank	.125″	thick
B12736B	Blank	.145″	thick

"It is advisable to use the older series of seed plates with all seed hoppers manufactured prior to this past summer which have a bottom casting number of N4536D. The older plates are:

N 4040 D	72-Cells,	10/64″	holes
N 4090 D	72-Cells,	11/64″	holes
N 4428 D	72-Cells,	12/64″	holes
N 4488 D	Blank	.125″	thick
N 4487 D	Blank	.145″	thick

"We regret the necessity of adding the new series of beet seed plates to our line because it may be that some customers, through error or otherwise, may attempt to use the new larger plates in old seed hoppers or vice versa. However, the planting of monogerm seed requires an extremely close fit between the plate and the hopper bottom in order to keep seed crackage to a minimum.

"We are confident that these latest No. 70 Flexi-Planters will do a very accurate job in planting monogerm seed, as well as all other varieties of beet seed."

The John Deere Flexi-Planter operator's manual (ON-B69-1159) tabulates plate part numbers for segmented seed on page 17. Growers for Spreckels Sugar Company are advised that these recommendations are such as to call for cell diameters 1/64″ larger than maximum nominal seed size. However, experience would indicate that more uniform cell fill and higher planter speeds are possible if the cell diameter is 2/64″ larger than the maximum nominal seed size. Therefore, since Spreckels seed is all screened to 7/64″ to 10/64″, we recommend 12/64″ cell diameter, as found on plate No. B12734B.

SPRECKELS STARTS NEW CONSUMER SUGAR PROMOTION PLAN

BY DAVID LEARY
Advertising and Merchandising Manager

SPRECKELS consumer sugar sales are mainly in our advertising area of western Washington, Western Oregon, California, northern Nevada and Arizona. Our competition — and it is tough competition — consists of C&H throughout the area; U&I and White Satin (Amalgamated) in Washington and Oregon; Holly, and two unadvertised brands, Union and American Crystal, in California and northern Nevada; and Holly in Arizona. A large portion of our current grocery product sales is in California. But in all these territories our sales of consumer sugars have increased considerably during the past five years.

THE PROBLEM OF DISTRIBUTION

These gains have been registered in spite of a serious obstacle. The average small grocer does not want to handle more than one brand of sugar — he doesn't have the space. Most large supermarkets will handle two brands and that's where the battle of the beets takes place. Some very large markets will handle three brands, but none of them wants to handle four. There's where the *Northwest* battle of the beets takes place. C&H enjoys very general distribution; U&I, White Satin and Spreckels slug it out for second and third positions. The loser very seldom enjoys fourth placement — he's out for the count.

It is not quite the same in California, because there are only three advertised brands in the battle: C&H, Spreckels and Holly — but what a battle there is among these three contenders!

PROMOTIONAL PROGRAM

So that we may do well in this battle of the sugar brands, we have introduced a promotional allowance program in northern California. Any grocer can qualify for this allowance by featuring Spreckels Sugar in one or more sales during the first three months of the year and by supporting our brand in his advertising.

We are backing up this program by publicity, advertising and calls made by our sales staff and our brokers' salesmen. All this should help us in the never-ending effort for placement and faster turnover in northern California supermarkets.

David Leary

You can be of help in this effort, if you will. Study the map on the next page. It shows why it is to the interest of every California grocer to feature Spreckels Sugar.

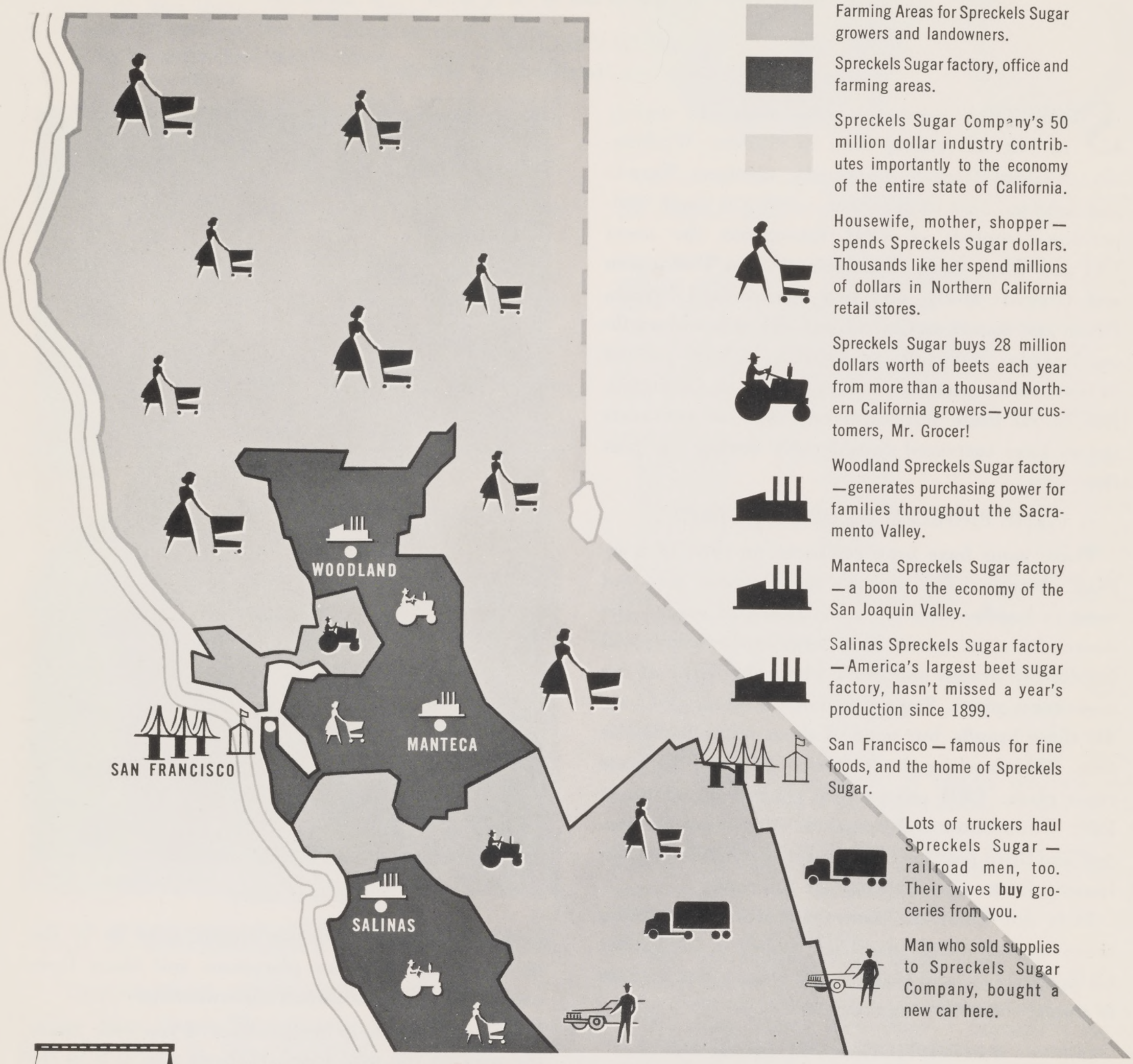
We shall be telling northern California grocers that Spreckels Sugar is a California product — grown and produced by Californians who are the customers of California grocers. We shall also be telling them that they and their customers can't buy a better sugar than Spreckels Sugar. We hope that you will give your grocer the same message.

(Over)

Map of

SPRECKELS SUGAR LAND

(Some folks call it Northern California)



Farming Areas for Spreckels Sugar growers and landowners.

Spreckels Sugar factory, office and farming areas.

Spreckels Sugar Company's 50 million dollar industry contributes importantly to the economy of the entire state of California.

Housewife, mother, shopper—spends Spreckels Sugar dollars. Thousands like her spend millions of dollars in Northern California retail stores.

Spreckels Sugar buys 28 million dollars worth of beets each year from more than a thousand Northern California growers—your customers, Mr. Grocer!

Woodland Spreckels Sugar factory—generates purchasing power for families throughout the Sacramento Valley.

Manteca Spreckels Sugar factory—a boon to the economy of the San Joaquin Valley.

Salinas Spreckels Sugar factory—America's largest beet sugar factory, hasn't missed a year's production since 1899.

San Francisco—famous for fine foods, and the home of Spreckels Sugar.

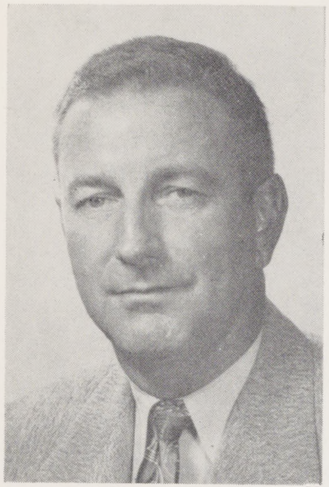
Lots of truckers haul Spreckels Sugar—railroad men, too. Their wives **buy** groceries from you.

Man who sold supplies to Spreckels Sugar Company, bought a new car here.

'ROUND AND 'ROUND THROUGH SPRECKELS SUGAR LAND THE SPRECKELS SUGAR MONEY GOES. SPRECKELS SUGAR IS GROWN AND PRODUCED IN CALIFORNIA BY CALIFORNIANS—YOUR CUSTOMERS, MR. GROCER!

WITH SO MANY READY-MADE SPRECKELS SUGAR CUSTOMERS YOU HELP YOURSELF WHEN YOU FEATURE SPRECKELS SUGAR!

CHANGES IN AGRICULTURAL STAFF



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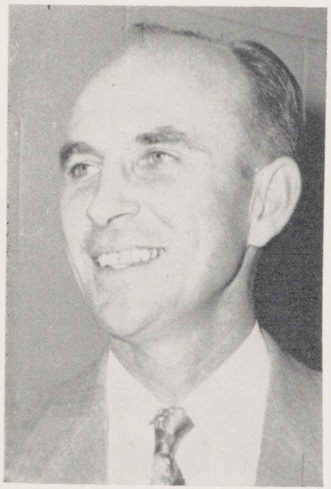
DAN L. DIETER

SPRECKELS GROWERS will have an opportunity to acquaint themselves with members of the agricultural staff now at new locations in Districts 2 and 3. In District 3, Woodland, Mr. Dan Dieter is now District Manager. Mr. Dieter was formerly Agricultural Superintendent of District 2, Manteca.



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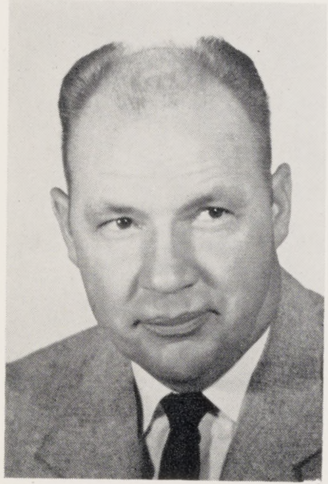
STEWART S. ANDERSON

The new Agricultural Superintendent for District 2 at Manteca is Stewart S. Anderson. Many of our growers are well acquainted with Stewart since he was their field superintendent in the area north of Manteca. The territory served from the Manteca office extends southward to Fresno.



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R. BRUCE DUNCAN

At Bakersfield, Bruce Duncan now holds the position of Agricultural Superintendent covering the area with Fresno on its north boundary, and extending southward through Bakersfield to the southern limits of the Spreckels growing area. Bruce will continue to make his headquarters at 431 Kentucky St., Bakersfield.

CANDY: A WORLD-WIDE FOOD

By JAMES K. BROWN
Sales Department
Spreckels Sugar Company

THE USE OF CANDY has a history stretching back 4,000 years. The Egyptians of 2000 B.C. described brightly colored "honeyed confections."

The word *candy* is derived from the Arabic word, *qand*, for its chief ingredient, sugar. This word and the "sweet reed" it described were brought from the Middle East to Greece by the soldiers of Alexander the Great. The juice of the reed was mixed with spices and honey and flour paste, and then colored. For centuries candy was used primarily by apothecaries to mask the taste of bitter medicines. It has only been since the Middle Ages that its more positive virtues have gained recognition.

Sugar is the basic ingredient of today's candy, accounting for about two-fifths of the weight of an average piece (but for only about a quarter of its cost). Some of the other raw materials that go into candy are of interest.

When the Spanish Conquistadores invaded Mexico in the early sixteenth century, they found that the Aztecs had long enjoyed a drink they called *chocolatl*

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BACK OF EVERY box of candy stand the sources of all the good things that are skillfully blended into enticing confections. Principal ingredient is sugar — accounting for 40% of candy's weight, but only 25% of its cost.

which was made from the beans of the cacao tree. Cortez brought some of the beans back to Spain and his countrymen soon learned that adding sugar to chocolate improved its flavor immeasurably. Curiously, chocolate did not become a common coating for candy until less than a century ago. Next to sugar, chocolate is now the most common ingredient of candy. The new African nation of Ghana leads the world in its production.

Vanilla is the most popular candy flavoring. The vanilla vine (a species of orchid) now is artificially pollinated to obtain maximum yields. Today Madagascar is the world's vanilla-growing center.

Fruits from all over the world are converted into candy and nuts from many countries are added to it. (About two-thirds of California's almond crop is sold to candy makers.) Nor does this exhaust the list of ingredients. Honey from Cuba, dates from the Middle East, and gum arabic (for marshmallows) from Egypt, all are important raw materials for candy makers. Some 30 countries in five continents supply 77 raw materials for this industry.

Candy many be divided into three types:

1. Candies made almost entirely of sugars: stick candies, crystalized creams, and hard candies.
2. Candies made largely of sugars but with up to five percent of non-sugar ingredients: pectin jellies, marshmallows, and nougats.
3. Candies with considerable non-sugar ingredients: fudges, caramels, chocolates, etc.

Within these types are 2400 varieties of candy.

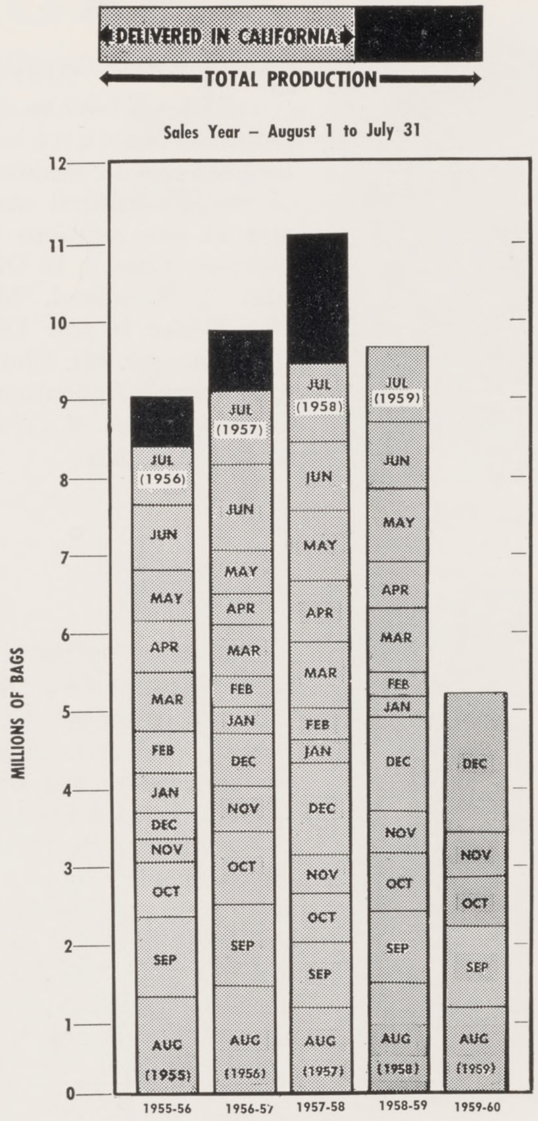
The making of candy became a significant enterprise only in the middle of the nineteenth century. By 1850 there were about 380 manufacturing firms in this country with sales of $3,000,000. By 1909 volume had increased forty-five-fold to $134,000,000. In the next half century this increased another eight-fold to $1,100,000,000.This figure represents the business done by 1200 firms in 1958 and places candy-making in eighth place among American food-processing industries. Last year candy ranked third in the industrial use of sugar in this country, exceeded only by the bakery and beverage industries.

Per-capita candy consumption in the United States is slightly more than 16 pounds a year.

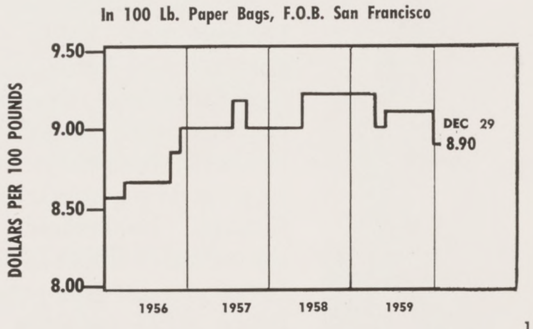
In strong contrast is England's annual per-capita consumption of 28 pounds, indicating that there is considerable unrealized potential in the U. S. candy market. This would entail, among other benefits, higher sugar requirements, with obvious benefits to the beet sugar industry. But England's figure is modest compared to the candy-eating habits of Diamond Jim Brady. He was known on occasion to polish off a pound in five minutes. A teetotaler, he could have agreed with only the first half of Ogden Nash's endearing quatrain:

Candy
Is dandy,
But liquor
Is quicker.

PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



QUOTED PRICE OF BEET GRANULATED SUGAR



The SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.
AUSTIN ARMER, EDITOR — SPRECKELS SUGAR COMPANY — WOODLAND, CALIFORNIA

APR 25 '60

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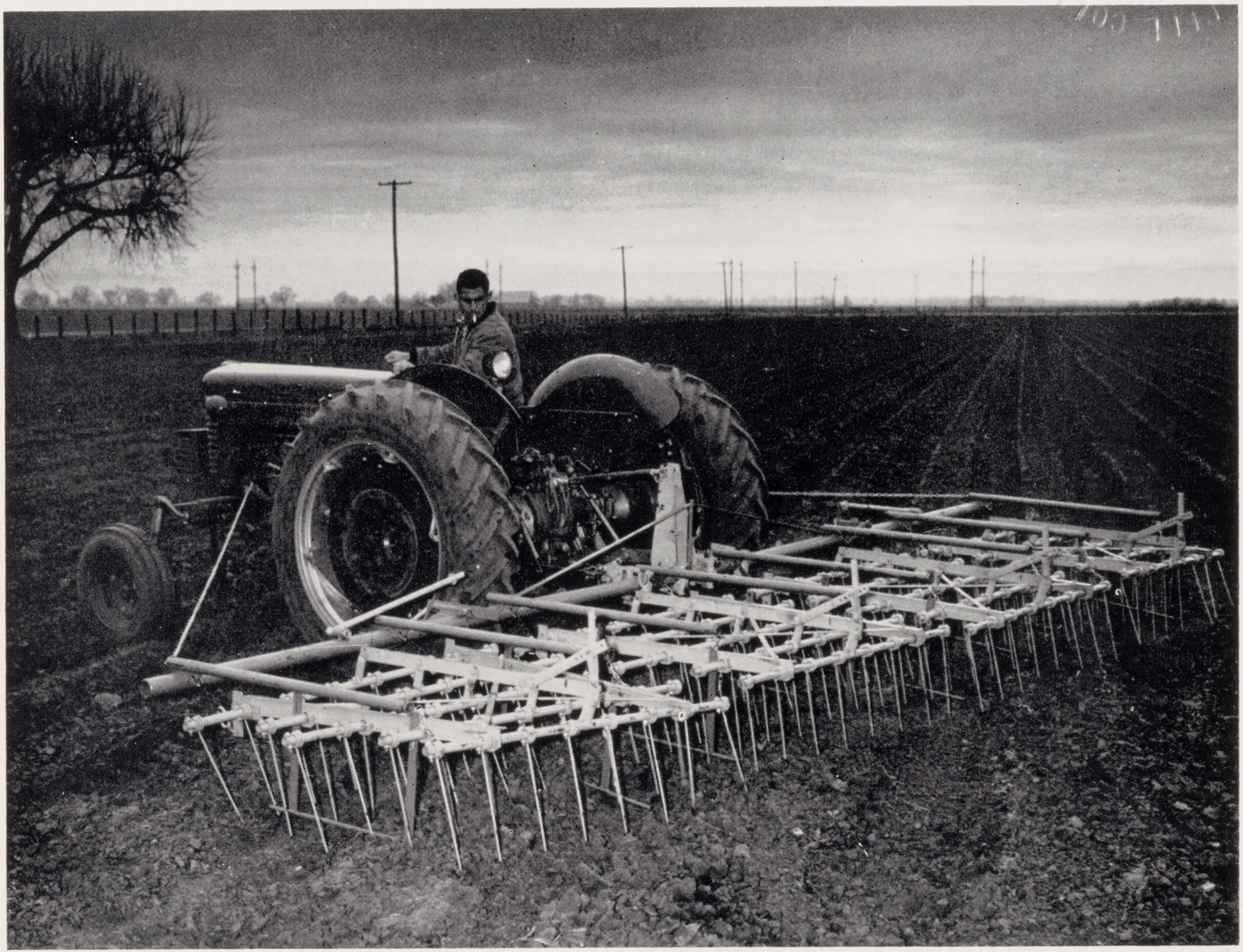
SPRECKELS SUGAR BEET BULLETIN

VOL. 24 MARCH—APRIL, 1960 NO. 2



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SPRING TINE IN SPRING TIME

—just one of the many new mechanical aids to spring work in the beet field.

PLANTING
THINNING
WEEDING

are interrelated operations; coordinated machines and methods are well on the way to eliminating most field labor. See page 10.

SPRING MECHANIZATION SUCCESS DEPENDS ON GOOD PLANNING

IF THIS TITLE sounds like an old story, forgive us. It may be an old story, but it is one worth repeating.

The point we would like to emphasize is that there is no one tool—no one method—which is the key to successful spring mechanization. On the contrary, the success of spring mechanization depends on complete coordination of methods with all available tools.

AVAILABLE TOOLS

In examining all of the implements now offered for use in a mechanized program of spring work, we come up with a rather impressive inventory. Many of these tools are quite new in terms of general acceptance. Even though the ideas may be old, some of the tools embody a high degree of perfection which has recently earned for them general acceptance. Among such implements are:

Improved fertilizer-lister combinations.
Bed shaper and planter combinations.
Thinning and cultivating combinations.

One of the most significant trends is the combination of the last two pairs of functions into one tool—the general purpose sled.

THE COORDINATED PROGRAM

In order to put these tools to work toward the end of minimizing field labor while still producing optimum crops, there must be a thorough-going plan of operations fitted to the particular needs of the individual grower's field. A stereotyped program of mechanized spring work cannot be set down, because all fields differ in regard to soil type, irrigation methods, climatic conditions and planting dates.

In general, however, an outline of a mechanized spring program is possible provided it is properly interpreted and adapted to these particular circumstances. Such a program might well follow this outline:

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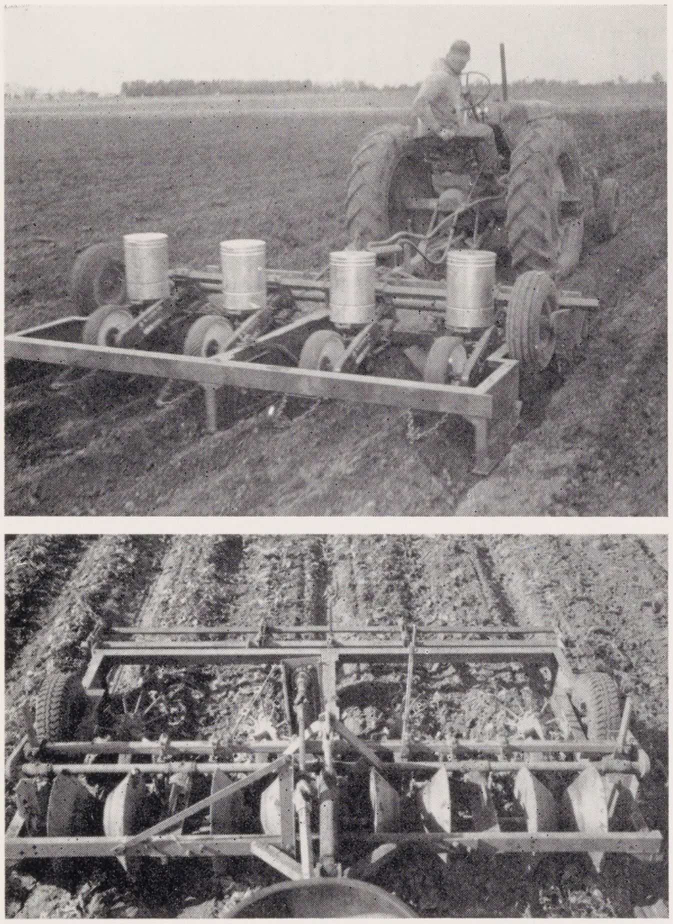
LISTING AND FERTILIZING (Preplant) is the first pair of operations in a well-planned mechanical program.

1. SELECTING THE RIGHT FIELD
   The choice of field will depend upon acreage allotment, rotation and suitability of the land to the beet crop.
2. LAND PREPARATION
   Heavy tillage may be with chisels or mold board plows, depending upon previous crops and soil texture. Disking will follow heavy tillage provided the field has been properly leveled.
3. LISTING AND FERTILIZING
   The use of preplant fertilizers applied in the center of the bed as listed is quite general practice. But if a second application of nitrogen—containing fertilizer is anticipated, take care to avoid excessive rates of nitrogen in the initial application.
4. BED SHAPING AND PLANTING
   These two operations are combined if a sled type planter (or general purpose sled) is used. Anticipate mechanical thinning by planting seed at a moderate rate using as low a rate as possible consistent with germination potential of the individual field.
5. CHEMICAL WEED CONTROL
   In areas where pre-emergence weed control chemicals such as Endothal have demonstrated their ability to control early emerging weeds, the application of such chemicals should occur immediately after planting.
6. THINNING AND CULTIVATING
   If the mechanical thinner is mounted on a universal sled, thinning may be followed by cultivating with knives mounted on the rear tool bar. If a tractor mounted thinner is used the rear tool bar may carry the cultivating knives (this sequence is not always possible—it is sometimes necessary to cultivate before thinning).
7. SIDE DRESSING AND CULTIVATION
   If a second application of fertilizer is needed, it may be combined with one of the later cultivating operations, *making certain not to over-fertilize.*
8. IRRIGATION
   Timing of irrigation is dependent entirely on local soil and climate conditions. The choice between furrow irrigation and sprinkler irrigation is influenced by soil type and economic factors.

It will be noticed that in the foregoing program numerous operations have been paired up so that they could be accomplished with a single passage of the tractor over the field. Two very good reasons exist for performing multiple operations whenever possible. These reasons are avoidance of soil compaction and the reduction of tractor operating hours.

Soil compaction is a subject which has always been of concern, but which is only recently coming into focus as one of the major aspects of land management. While rubber tired tractors are generally accused of being most damaging from the standpoint of compaction, there is some reason to believe that the tract type tractor can do considerable harm due to its high-amplitude vibration which causes the fine particles of top soil to sift downward through the



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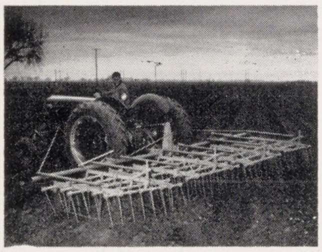
BED SHAPING AND PLANTING (Above) is the second dual operation. The increasing use of multi-purpose sleds permits mounting the thinner units in the same sled, using guide-spools. (Below)

cracks in a dry, recently-worked field.

The value of reducing tractor hours is self-evident. Such programming permits a single tractor driver to accomplish more work and, of course, cuts down on the hourly cost of tractor operation with respect to fuel and maintenance.

YOUR OWN PLAN

Let it again be emphasized that the outline of operations here suggested is only a recommendation, not specific to any particular field. Perhaps it would be of most value if examined critically in comparison to some of the plans already tailored to the individual field. Our purpose has been served if it will cause the grower to stop, think, and plan a coordinated program of spring mechanization.



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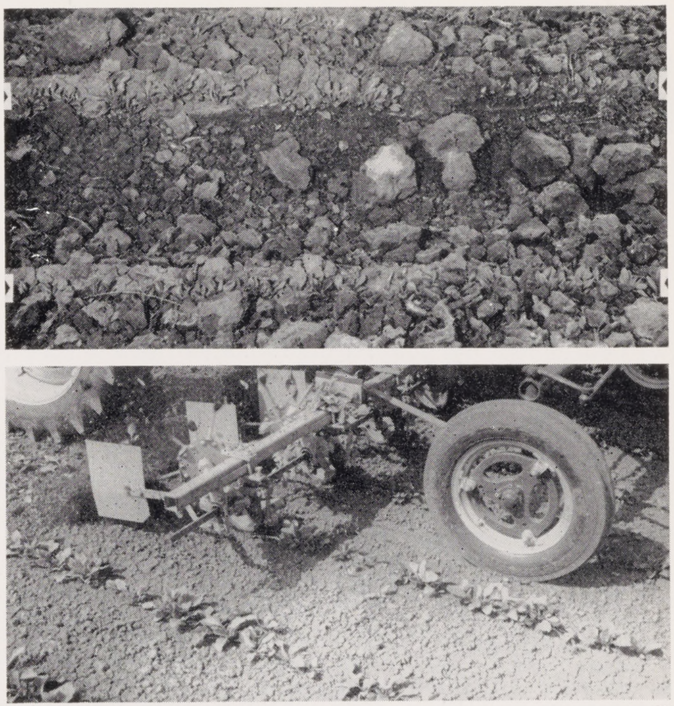
COVER COMMENT—the spring tine harrow is a link in the chain of tools which can be coordinated into a planned program of beet crop production involving a minimum of field labor.



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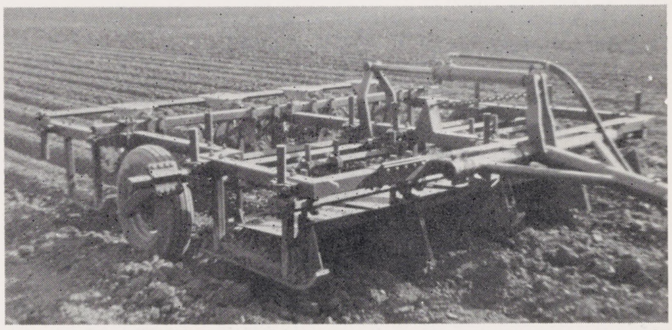
OBSTACLES to complete mechanization include soil-weather combinations leading to such extreme clod formation (above) that the use of thinning machines or spring-tine cultivators becomes impractical.

In contrast, ideal conditions for machine thinning (below) result when beets are sprinkler-irrigated for germination, and soil does not form a thick crust.



Johnson Farm Machinery Co. Photo

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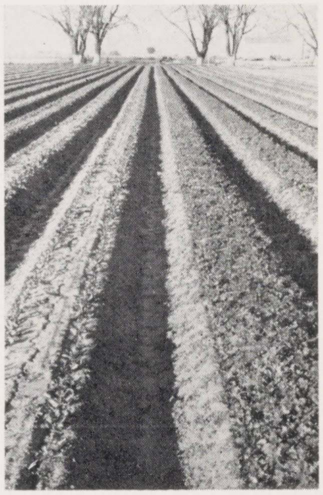
ABOVE — Latest multipurpose sled is offered by Johnson Farm Machinery Company, Davis, Calif.

→

PRE-EMERGENCE weed spraying with Endothal (left) eliminated the crop-smothering weed growth seen on the right-hand beds.



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The Honor Roll For 1959

DISTRICT I — SPRECKELS

Growers in all districts produced crops whose yields exceeded all previous records. In district I, the harvest of the 1959 crop is completed, and we proudly publish the names of Spreckels growers whose contracts yielded 25 tons per acre or more.

Because of the steady increase in yields in the Salinas Valley, averaging 25 tons or better for the past two years, we believe that the goal for the Honor Roll should be established at a higher figure. For the 1960 crop we propose to publish the Honor Roll on the basis of 30 tons or more.

OVER 40 TONS PER ACRE

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
John D. Domingos	21.5	53.60	17,036
Peter A. Stolich Co., Inc.	36	49.35	12,829
Gerald Griffin	10	48.37	14,513
Richard Del Piero	9	48.05	14,788
L. C. H. Co.	18	47.03	14,449
Richard Del Piero	5	46.96	14,186
Salinas Valley Vegetable Exchange	67	46.80	11,139
Schuman Farms	24	46.72	12,174
T. O. Tomasello	12	46.56	12,875
O. O. Eaton, Inc.	41	45.47	11,373
Salinas Valley Vegetable Exchange	32	45.47	10,517
Art Weatherly	21	45.24	14,434
Steve Pervetich	11	44.69	12,153
E. H. Abeloe & Son	36	44.64	13,352
A. Gill Ranch Co.	28	44.13	13,873
Peter A. Stolich Co., Inc.	29	43.53	13,929
Fujii Brothers	10	43.28	12,999
Frank Corda	18	43.01	12,333
J. E. Culver & Son	40	42.85	13,333
Forden Farms	29	42.72	14,451
Taix, Vessey & Auker	10	42.71	10,984
Maynard H. Frudden	9	42.25	14,612
I. Sciaroni & Jack Ferrasci	25	42.07	12,304
Tognetti & Fillippelli	53	41.87	12,653
Albert C. Hansen & Son	39	41.80	11,366
Tony L. Silveira	23	41.74	12,946
William D. Crinklaw	156	41.72	13,581
Carl Schulz	14	41.57	12,789
De Francesco Brothers	22	41.56	12,678
J. J. Crosetti	22	41.15	11,400
Gerald Rianda	34	41.04	12,309
Antonio F. Silveira & Sons	34	40.93	13,247
William D. Crinklaw	69	40.90	14,119
Quattrin Brothers	21	40.67	11,490
Albert C. Hansen & Son	126	40.64	12,103
Sturla Brothers	8	40.62	11,759
Phillips Wyman, Jr.	21	40.54	10,029
Nunes & Hooks	24	40.50	11,539
A. S. Duarte	28	40.42	13,293
James H. Watson	16	40.37	12,925
Pete Vojvoda	9	40.35	10,628
Harden Farms of California	84	40.28	11,274
Norman F. Bundgard	82	40.24	10,347
Tognetti & Fillippelli	65	40.19	13,360
R. J. Thorne	6	40.11	10,230
E. John Nielsen Co.	17	40.10	13,542

30 TO 40 TONS PER ACRE

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Bruce Church, Inc.	52	39.84	9,272
Botelho Brothers	13	39.83	11,563
Pete Vojvoda	8	39.80	11,713
R. Buck Boone	31	39.79	11,417
Jim Fanoe	133	39.57	12,014
Hidemoi Hatai	7	39.49	11,354
William A. Hart	22	39.20	10,414
Joe Cunha	74	39.16	11,317
Pauline Capitanich	26	39.16	10,023
Kelly-Thompson Ranch	11	39.14	12,121
Wilmer Pura	11	39.13	12,956
Tavares Brothers	11	38.99	12,079
*Hatton J. Martin	25	38.88	12,553
Foster Hutchings	21	38.87	11,249
Forden Farms	29	38.76	10,977
Manuel Cunha	48	38.63	12,719
L. & A. Salmina	18	38.49	11,592
West Coast Farms	9	38.48	10,662
Obata Brothers	33	38.45	11,703
Ben Masciarini	37	38.36	11,509
O. O. Eaton, Inc.	8	38.30	8,407
Franscioni-Griva Co.	55	38.29	12,035
Obata Brothers	24	38.29	11,714
David W. MacMillan	33	38.25	11,001
Merrill Farms	25	37.94	12,016
L. C. H. Co.	28	37.81	11,595
Manuel Dias	2	37.77	12,379
Anthony Silva	25	37.71	12,070
Richard Del Piero	9	37.67	11,371
McNamee Ranch	15	37.66	12,103
Schween Brothers	70	37.60	12,038
Arrow Lettuce Co.	29	37.59	12,546
Chas. Morgantini & Sons	16	37.54	13,148
J. E. Culver & Son	15	37.48	11,504
J. H. Hayes	21	37.48	11,431
W. W. Johnson & Son	8	37.43	11,724
*Raymond Martin	15	37.39	11,633
Lindeleaf Brothers	23	37.27	11,584
Leon J. Lazo	11	37.17	11,497
Mine Brothers	33	37.12	10,129
Antonio F. Silveira & Sons	8	37.07	11,415
Frank J. Silva	40	36.93	9,852
Thos. B. Porter	46	36.91	11,608
Clark & Togni	31	36.88	11,091
Arnold Bassetti & Son	16	36.86	11,958
W. L. Stacy & Son	18	36.84	12,515
McKinley & Nevins	30	36.84	12,183
W. R. Stephenson & Son	19	36.55	11,407
John Oreggia & Co.	64	36.52	10,937
Clark & Romans	80	36.45	10,869
A. D. Villarba	17	36.40	10,645
*C. L. & A. W. Johnson	10	36.31	12,140
Phil & Ed. Martin	21	36.28	11,058
*W. W. Johnson & Sons	27	36.22	11,538
H. Y. Ikeda	20	36.22	10,655
Gularte Brothers	35	36.15	10,350
Joseph B. Silva	18	36.07	10,400
Sam L. Mann	8	35.90	11,386
F. V. Birbeck Company	44	35.77	11,076
Frank Taylor	47	35.72	11,782
Jackson Vessey	26	35.67	11,034
Obata Brothers	54	35.67	10,072
John P. Botelho	5	35.66	10,950
B. E. Johnson	27	35.64	12,645
United Farms Co.	4	35.59	8,541
Robert A. Smith	30	35.57	10,692
Vosti Brothers	15	35.56	11,620
Victor E. Johnson	26	35.50	10,169
Carl M. Nielsen	30	35.49	11,510
C. L. & A. W. Johnson	59	35.44	11,149
O. L. Petersen	45	35.34	9,382
Leon J. Lazo	15	35.28	10,688
F. S. Travers & Son	22	35.23	9,258
Arcotti Brothers	35	35.22	10,721
Michael K. Reed	35	35.15	9,824
Howard Handley	28	35.10	10,859
W. M. Sullivan	70	35.02	11,373
Henry Guidotti & Sons	44	35.01	10,535
Michael K. Reed	47	34.89	11,039
T. G. Bacciarini	23	34.71	11,371
Joe Gerber	15	34.71	10,203
Luis Scattini	28	34.66	10,128
D'Arrigo Bros. Co. of Calif.	40	34.62	10,794
Roy Uyeno	45	34.60	9,673
*Arrow Lettuce Company	27	34.57	11,138
Mary F. & E. E. Nutting	44	34.56	9,762
Fabretti & Dedini	44	34.52	11,465
Tom Da Rosa	97	34.52	10,456
Lazzio & Cavalli	13	34.46	10,392
West Coast Farms	44	34.43	10,621
Tony Homen, Jr.	20	34.38	11,003
Fanoe Brothers & Sons	215	34.28	11,449
H. Allemand	46	34.19	9,650
*Peter A. Stolich Co., Inc.	19	34.14	9,021
Peter Lesnini	27	34.06	11,207
Joe Merkle	28	33.82	11,272
Nunes Brothers	51	33.74	10,750
Chas. Morgantini & Sons	24	33.68	11,162
United Farms Company	125	33.68	9,336
R. Sargenti & Son	17	33.67	11,243
Frank Taylor	38	33.61	10,476
Burke Farm Co.	43	33.57	10,933
Franscioni & Company	26	33.56	11,081
O. O. Eaton, Inc.	6	33.56	9,408
Lawrence Brickey	94	33.49	10,744
Salaberry & Guidici	100	33.44	11,047
Joseph Gubser, Sr.	34	33.44	10,619
Lee F. Smith	30	33.43	10,492

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
H. F. Trafton & Son	35	33.43	10,296
Ferry-Morse Seed Company	27	33.30	11,325
Ambrosini & Pisoni	39	33.28	9,857
R. V. Tidd	14	33.27	7,627
Martella Brothers	29	33.17	10,719
John Silveria & Sons	54	33.16	10,706
Chester B. Imwalle	19	33.04	9,240
Dean E. Pryor	30	32.97	10,784
Joe C. Gonzales	4	32.95	9,741
J. M. Thorne	61	32.92	10,274
R. Marci	10	32.91	8,384
Taix, Vessey & Auker	20	32.90	8,888
Matteucci Brothers	11	32.77	10,600
Shimonishi Brothers	17	32.70	9,754
Ira E. Hudson & Son	59	32.64	9,763
Farley Fruit Company	92	32.53	9,934
Arthur Bigiogni	15	32.47	10,620
Maynard H. Frudden	85	32.37	10,538
Charles A. Kelly & Son	52	32.35	9,721
Michael K. Reed	21	32.28	10,529
Botelho Brothers	15	32.24	10,587
Turri Brothers	85	32.24	9,996
Herold Ranches	175	32.23	10,825
Hartman-Janss Ranch Co.	96	32.05	10,832
T. R. Smith	43	32.03	10,234
R. Buck Boone	19	32.02	9,647
Jim Fanoe	30	31.99	10,598
Corda & McDougall	38	31.97	9,403
G. A. Stephens	67	31.86	8,718
Willis G. Pack	34	31.73	9,998
George Ross	71	31.73	9,777
F. V. Birbeck Company	10	31.70	9,826
Joseph B. Silva	22	31.64	9,796
Turri Brothers	72	31.63	10,069
Bellone & Del Chiaro	40	31.62	10,060
Leo & Robert Meyer	36	31.59	9,944
Bernis Steidley	26	31.58	9,241
G. W. Herbert	69	31.57	10,539
Carl M. Mortensen	29	31.56	9,727
Harry R. Johnson	53	31.53	9,687
Raymond Martin	115	31.50	10,598
M. P. Domingos	40	31.48	10,501
A. L. Heinzen	25	31.44	11,043
Tondre Alarid	45	31.43	10,909
Obata Brothers	33	31.38	8,385
Leonard F. King	24	31.29	9,937
M. G. Da Rosa	51	31.29	9,411
Paul W. Bertuccio	25	31.27	10,218
Frank J. Ostoja	9	31.22	10,622
Merrill Packing Company	26	31.19	9,307
B. J. Marks Family	99	31.18	10,240
E. J. Foletta & Son	38	31.17	8,151
Jerome Kantro Company	25	31.16	8,725
Massa Brothers	27	31.12	7,266
John Gardoni	11	31.09	10,234
Owen T. Rice & Son	36	31.07	10,047
Anthony Silva	54	31.06	9,158
Martin Produce, Inc.	17	31.05	9,888
Jackson Vessey	11	31.04	10,214
Walter Jefferson & Son	40	30.91	8,487
Louie Manzoni	18	30.89	9,472
J. J. & H. Violini	14	30.84	10,741
W. W. Johnson & Son	62	30.81	10,979
Merrill Farms	69	30.80	7,803
E. A. Ramirez	11	30.66	9,112
Margaret Ryan	15	30.63	8,587
Schween Brothers	52	30.59	9,035
Ning Young & Sons	16	30.55	9,786
G. A. Stephens	30	30.50	8,454
Tom Okita	21	30.46	8,140
Charles Gianolini	30	30.41	9,648
McNames Ranch	16	30.40	9,398
Hatton J. Martin	53	30.36	9,559
James M. Hughes	37	30.32	9,385
Martella & Buzzini	31	30.31	9,806
Bruce Church, Inc.	32	30.29	8,960
Art Manzoni	12	30.20	9,382
R. B. Little	36	30.09	10,178
W. & S. Packing Co.	80	30.08	8,445
*Roy W. Johnson	41	30.04	9,216
Manuel Sequeira, Jr.	6	30.01	9,097
25 TO 30 TONS PER ACRE			
Paul Hudner	17	29.94	9,302
J. G. & E. J. Homen	16	29.77	10,084
Robert Renz	28	29.70	9,062
George Ross & Robert Dutra	70	29.66	9,688
Jensen Farms, Inc.	18	29.54	9,521
Frank Medina	4	29.47	9,728
Art Manzoni	10	29.19	9,267
*Albert C. Hansen & Son	26	29.14	9,043
Lanini Brothers	6	29.13	9,326
L. W. Wing	251	28.96	8,810
E. Vosti & Sons	25	28.87	8,911
A. Leonardini	10	28.87	8,834
Sam Shiotsuka	111	28.87	8,609
Walter L. Mathison	15	28.85	9,579
Paul Giacomazzi	23	28.84	9,766
Fred & Martin Ramseier	37	28.80	8,590
Roy Alexander	22	28.78	8,894
Emil C. Meyer	80	28.73	9,433
Bundgard & Conrow	33	28.68	7,550
*Jensen Farms, Inc.	129	28.59	8,857
Edward A. Johnson	21	28.54	8,861
Mary F. & E. E. Nutting	29	28.49	9,017
Casillas Brothers	13	28.43	9,642
James & Elmer Johnsen	105	28.41	8,726
Botelho Brothers	19	28.40	8,741
Raphael Pura	18	28.39	8,470
G. A. Stephens	29	28.35	8,737
Jerome Kantro Co.	31	28.32	7,318
M. S. Furtado & Son	12	28.23	8,524
E. John Nielsen Company	21	28.14	9,049
R. V. Boone	9	28.11	8,062
Johnson Brothers	45	28.06	9,269
William J. Soares	25	28.01	9,273
George P. Lowrie	109	28.00	9,239
Schween Brothers	77	27.97	7,924
E. John Nielsen Company	16	27.94	8,920
Joe Alves	8	27.88	9,197
Fausto Morisoli	11	27.84	9,116
Ira Hudson & Son	112	27.80	8,999
Henry E. Corda	22	27.78	9,455
Roy W. Johnson	32	27.71	8,346
T. R. Nishimoto	11	27.70	9,175
M. G. Da Rosa	120	27.66	8,906
J. E. Culver & Son	66	27.62	9,366
Pete Fanucchi	59	27.62	8,781
Danini Brothers	25	27.61	8,245
James M. Johnsen	28	27.54	9,159
Walter L. Mathison	8	27.42	8,730
Donald F. Davies	21	27.39	8,355
Bassi Brothers	33	27.36	8,182
Louis L. Gularte	55	27.35	9,091
Frassetti Brothers	29	27.33	8,146
Tognetti Brothers	67	27.31	8,878
Leon J. Lazo	6	27.30	8,969
Lawrence Brickey	55	27.28	8,276
A. Frew	77	27.26	8,413
Jim G. Bardin	45	27.24	8,741
San Vincente Farms, Inc.	20	27.19	8,925
J. & V. Franscioni	14	27.12	8,887
Jay M. Muther	33	27.07	9,040
Ferini & Ardantz	52	27.06	8,088
Latasa Brothers	110	27.04	9,565
Phillips Wyman, Jr.	12	27.04	8,801
Louis Ferrasci	46	26.93	9,726
W. D. Loveless & Son	21	26.87	8,939
California Orchard Co.	50	26.87	8,432
A. R. Culver	42	26.82	8,803
Jensen Farms, Inc.	44	26.80	8,121
J. N. Neal	187	26.78	8,390
D'Arrigo Brothers Co. of Calif.	45	26.72	8,139
Bruce Church, Inc.	21	26.70	9,241
E. O. Parker	69	26.68	8,252
Albert Rohde	51	26.64	8,453
Pete Fanucchi	13	26.60	7,277
Owen T. Rice & Son	62	26.42	8,195
Latasa Brothers	67	26.36	9,191
Owen T. Rice & Son	37	26.28	9,482
*Tony Ferriroli	19	26.19	8,550
Kamimoto Brothers	44	26.11	7,688
Harry Fugikawa	21	26.10	7,854
John & Bob Corda, Jr.	21	26.09	7,902
Francis H. Rianda	20	25.96	8,876
Robert Harlan	10	25.88	8,908
H. E. Widemann	23	25.86	8,076
Nunes Brothers	16	25.82	8,274
*Anthony Rose	13	25.76	7,097
*Jerome Kantro Co.	25	25.56	7,399
George Bountonnet	17	25.56	7,247
T. R. Nishimoto	18	25.54	8,294
R. V. Tidd	18	25.53	6,748
Ning Young & Sons	34	25.52	7,194
Joe Alves	15	25.50	8,262
James H. Watson	30	25.49	8,152
Art Weatherly	9	25.42	8,330
Phillips Wyman, Jr.	19	25.37	8,299
Frank Medina	14	25.35	7,933
Harry R. Semas	64	25.34	7,710
J. J. Crosetti	13	25.33	7,731
F. V. Birbeck Company	37	25.31	7,674
Jack Baillie Co., Inc.	26	25.31	7,337
United Farms Company	87	25.21	7,619
Tom Hudson	15	25.19	7,849
William A. Hart	8	25.19	7,826
Valerio Vosti	39	25.18	8,202
A. L. Clement & Sons	116	25.10	7,836
Ning Young & Sons	29	25.02	8,177

***1958 Late Plant Crop.**

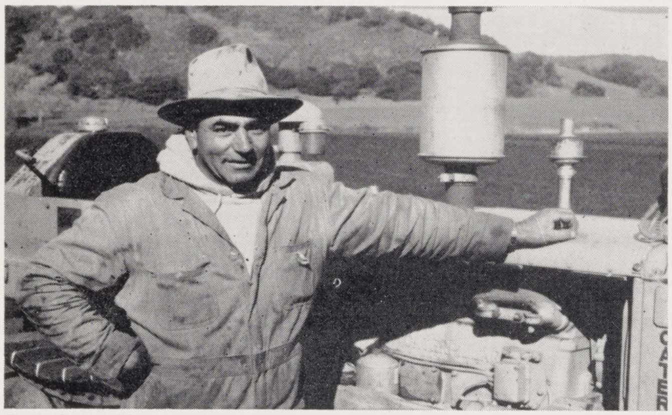
SOME NOTES ON A RECORD YIELD

By JAMES E. GARDINER

Field Superintendent, Spreckels Sugar Company

THE SETTING of new sugar beet production records in the Salinas Valley seems to become an old story. Year after year the sugar per acre increases, and keeps increasing.

Last year a new record was set by John Domingos, who, on 21.5 acres produced 17,036 pounds of sugar per acre. John's yield was 53.60 tons per acre, with a sugar average of 15.89%.



T. B. Green Photo 23

JOHN D. DOMINGOS

John farms in one of the small valleys that lead into the main Salinas Valley. His farm land is located in a valley leading out of the Gabilan mountains. In fact, his farm land lays just below "Sugarloaf Mountain" around which the early horse stages had to detour as they came down Old Stage Road.

This little valley, while being very fertile, does not have enough water to sufficiently irrigate all the land for the full growing season. But John has improved his water situation a great deal by methodically clearing the brush out of Gabilan Creek, and installing lift pumps to carry water to his sprinkler system.

In the past John has had several crops of sugar beets which yielded well over 30 tons to the acre, but usually was short of water for his final irrigation. However, this year a heavy rain in September took care of this situation, keeping his beets growing till they were harvested in early November.

It seems fitting that congratulations should be extended to John, because he put forth the effort which typifies good farming, and his reward was of his own making.

SPRING MECHANIZATION FIELD DAY AT SPRECKELS IS WELL ATTENDED

ON FEBRUARY 25th, upwards of 300 Spreckels growers attended a series of spring mechanization demonstrations in the beet fields adjacent to the Spreckels factory. A number of Sacramento and San Joaquin Valley growers journeyed by car and by air to view the demonstrations.

Growers saw two thinning machines in operation, the Eversman and the Silver. Factory representatives from both manufacturers were present to answer questions and to emphasize the importance of proper machine adjustments in relation to pre-thinning stand. Growers were also able to see work which had been done a week previously by these machines. Surviving beets had straightened up, and the quality of thinning achieved by well adjusted machines in a clean field was impressive.

Another feature of the field day was a plot showing the results of pre-emergence weed control. The entire field in which the demonstrations were held had been sprayed at planting time with Endothal. A portion—six beds—had been left with no treatment, and the contrast between clean beds and weedy beds was striking.

The interest in spring mechanization by sugar beet growers is attested by the large attendance at this field day, but undoubtedly has its basis in the fact that mechanical thinning and other chemical and mechanical aids to spring work are being adopted rapidly by growers in all sections.

Salinas Californian Photo 24

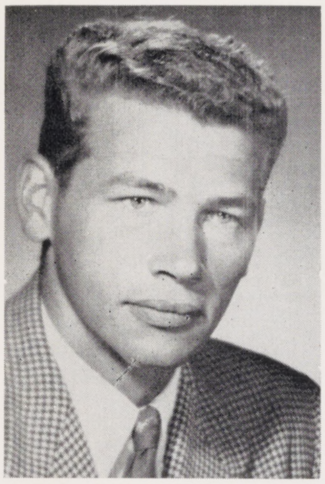
WELL ATTENDED. The spring Mechanization Field Day at Spreckels attracted over 300 growers.

Salinas Californian Photo 25

SPRECKELS HOST at the event was Walter Buckingham, District Manager, Spreckels.

Notes From Our Field Men

J. N. DAWE — STRATFORD



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The use of Endothal in the Stratford - Helm area is still in the experimental stage. Lauren Burtch, Agronomist of our Agricultural Research Staff, conducted this experiment. We applied Endothal, as an over-all application, at the rate of six pounds of actual material per acre on three fields near Corcoran, and one field west of Five Points. The material was sprayed on these fields immediately after planting. On the three fields at Corcoran, sprinkler irrigation was used to irrigate the beets up. At the Five Points location rain supplied the moisture for germination.

About one month after planting we find these results:

On the first field, a second irrigation was necessary in early December, and the grower furrow irrigated the beets to obtain a more uniform application of his water. The principal weeds here were Mustard, Barley, Wild Oats, and some Fiddleneck. The four row sprayed strips are discernible from the rest of the field, but a complete control was not effected here.

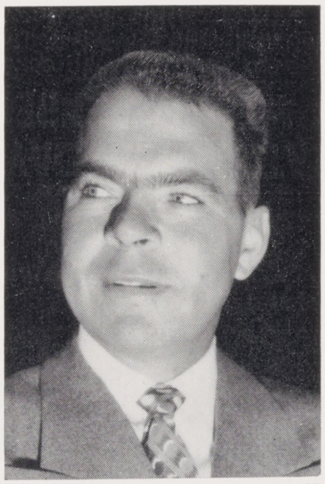
The second field has only one weed problem; volunteer barley. There was no furrow irrigation on this field and the effect of the Endothal is by far the most impressive here. By comparison to the rest of the field, a complete field treatment could have saved this farm many dollars in coming hoeing costs. It is interesting that this field was replanted, but the Endothal treated area was retained after the beds had been knifed and worked lightly with a rotary hoe.

In the other two fields there is, to date, no weed problem. By close inspection, when the beets were emerging one could determine where the Endothal had been applied by the retarding effect it had on the germinating beets.

A fertilizer distributor in this area has several Endothal plots on beets, applied in granular form and mixed into the beds with a specially built rotary hoe type implement. From looking at these fields, I have not been able to note any control of weeds because there are so few weeds in the fields where it was applied. This granular form of the material is supposed to have a more lasting effect than in the liquid form and should help in controlling the later spring weeds, such as water grass.

I intend to "push" the proper use of Endothal in my district as I feel it can be a real money saver if it is used when the weed history on a piece of ground dictates a special need. I will also attempt to talk down the indiscriminate application of the material as an "insurance" against weeds which can be controlled better, and with less cost to the grower; by good cultural practices.

HAROLD VOTH, SPRECKELS



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The effect of the use of Endothal as a pre-emergence weed control proved to be quite varied. While there is still much to be learned about its use to produce the most desired results, the following observations concerning its use were noted:

1. Endothal was more effective in heavier soils.

2. Endothal was more effective where rainfall closely followed its application, although even a delay up to seven weeks still produced an effect.

3. Too much or too little rainfall altered the results adversely. (a) An extremely light rainfall probably caused a deterioration of the material, plus the fact that not enough moisture was present to promote germination of the weed seeds. (b) Excessive rainfall or overhead sprinkling carries the material down past the area where it could properly destroy germinating weed seeds.

4. Some growth suppression was noted, more apparent in the lighter soils. Good recovery in most cases was evident.

5. The main weed escaping the effects of this material appeared to be chick weed, while seeds most readily affected were nettles, malva, pepper grass and some grasses. Deep seeded grasses such as barley and wild oats were not particularly affected.

6. In most cases one gallon of the material was used per acre, and was sprayed over a 24 inch spacing —thus covering the top of the bed and extending partly down the sides but not in the furrow itself. However, in some cases it was banded in six inch blades with the seed row in the center of the band and only two quarts of Endothal per acre were used. (One gallon of Endothal contains two pounds of active ingredient.)

7. Effective use of Endothal acts as an insurance agent against possible loss of fields or excessive thinning and weeding costs during abnormally long wet spells.

(Continued on next page)

Notes From Our Field Men

J. E. GARDINER, SPRECKELS

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I am heartily in favor of the use of Endothal on early plantings of sugar beets in my district, because of the over-all effectiveness of the material I noted that the best control was at the rate of one gallon and a half of Endothal per acre. In these cases, both bed and furrows were sprayed. We have found that the best results occurred when rain fell fairly soon after application.

In my district where there is an abundance of nettles, "Endothal" does a wonderful job of weed control. However, it will not kill chick weed, and apparently doesn't affect barley even though the producers of the material plainly state that their material controls barley.

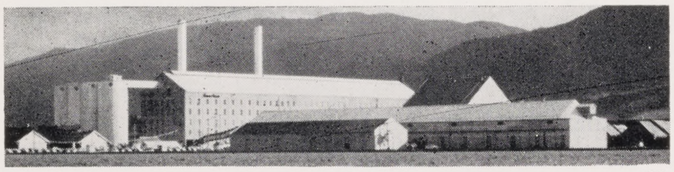
In Blanco and Watsonville where the soil type is predominately heavy, Endothal seems to work much better than in the lighter ground in the Natividad and Alisal areas. Possibly due to the moisture retaining qualities of the soil.

In several cases growers in lighter soil used sprinkler systems to take the material into the soil. Evidently their sprinkler settings were too long and the material penetrated deeper than the zone of best control.

EDITOR'S NOTE: The full reports on Endothal by these field superintendents included itemized data on weed control results. These data are here summarized:

Endothal Application in Salinas & Pajaro Valleys

Number of Beet Fields	Total Acres	% of Total A.	Results
18	562	17.6	Excellent weed control.
31	2,461	77.2	Fair to good weed control.
6	164	5.2	No practical weed control.
55	3,187	100.00 %	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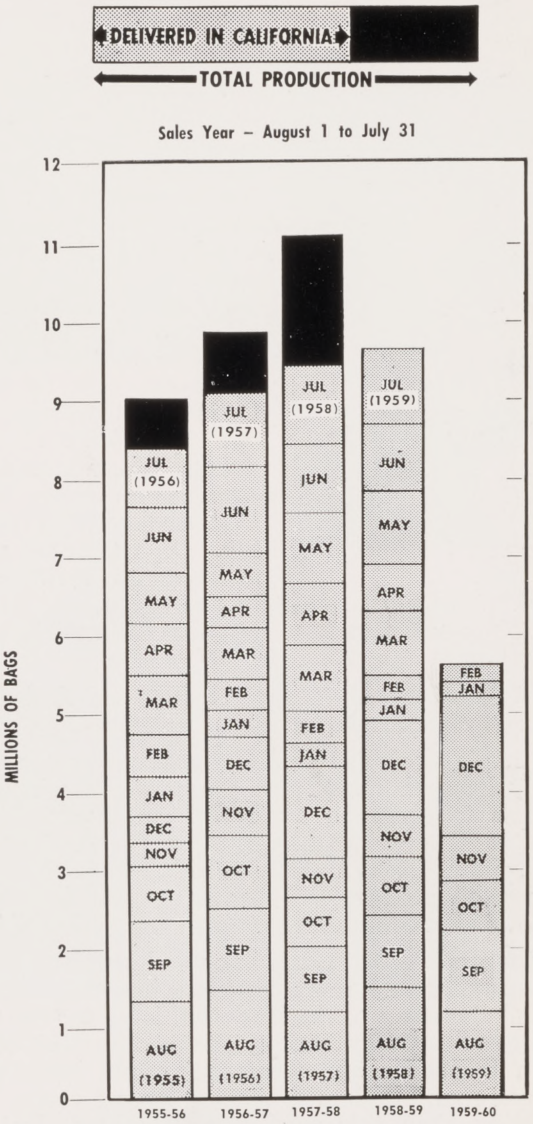
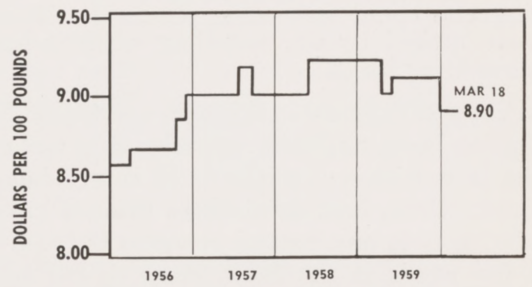
PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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The SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.
AUSTIN ARMER, EDITOR SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

SPRECKELS SUGAR BEET BULLETIN

VOL. 24 MAY—JUNE, 1960 NO. 3

JUN 27 '60

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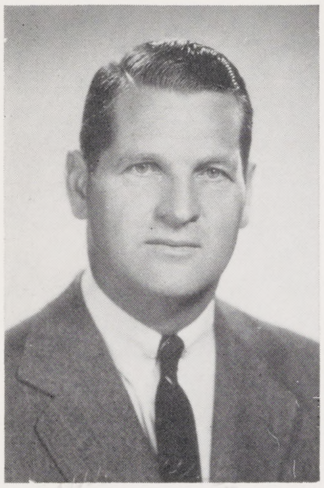
BETTER BEET SEED

is a grower service which Spreckels Sugar Company achieves by a highly organized research program.

BETTER CROPS
and
BETTER PROFITS

are the result. We devote this special issue to Spreckels research in sugar beet seed.

THE SPRECKELS SUGAR BEET SEED PROGRAM



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TO OUR GROWERS . . .

Spreckels Agricultural Research has been considerably expanded since the early fifties. The primary objective of this expansion was to make sugar beets a more profitable and desirable crop. In large part our effort was launched in recognition of the fact that successful agricultural research offered the best opportunity to cope with the anticipated cost-price squeeze.

Our program has been successful. It is with considerable pride that we relate in this special edition of the Sugar Beet Bulletin some of the problems, objectives and accomplishments of our agricultural staff in the field of plant breeding.

We are confident a better agricultural economy will evolve through a diligent research program. Our efforts will be directed toward attaining this goal.

Charles de Bretteville

Charles de Bretteville, President

SUGAR BEET SEED—the essential beginning of a profitable crop of sugar beets, may often be taken for granted by the average grower. He may think it is always available in good quality and proper quantities. However, the many complex steps taken to assure the grower of getting the varieties best suited to his needs is a fascinating story. It is also a long story. But we believe it will repay the reader's patience.

From the very beginning of the sugar beet industry in the United States, the processor has been the source of sugar beet seed for the grower. Because this is not a normal arrangement in agricultural crops, one might be interested in the reasons behind this method of handling the seed. The first varieties available to growers were all European, and sugar companies had to anticipate the acreage to be planted and order seed from the European seed producers. Only the processors were in a position to know the quantities of seed desired, and also what varieties had been proved in this country. Thus growers looked to the sugar companies for their seed supplies.

When curly top virus almost wiped out the sugar beet industry in the western United States, it was imperative to get seed with resistant qualities as rapidly as possible. The sugar beet industry joined forces with the United States Department of Agriculture to attack this problem.

A series of selections finally yielded strains with enough resistance to the virus to maintain beet production in areas affected by Curly Top.

But to increase the small amounts of seeds so selected required that a seed production program be established. No domestic seed industry existed on a commercial scale.

To increase a small amount of U. S. 1, the first curly-top resistant variety released by the U.S.D.A., the Spreckels Sugar Company contracted for 5 acres of beets for seed in the Hemet area of Southern California in 1932. This was the first commercial production by our company. In 1935 the West Coast Beet Seed Committee was organized to carry on the production of curly top resistant beet seed. The Seed Committee comprised all of the California companies, and also those in Utah and Idaho.

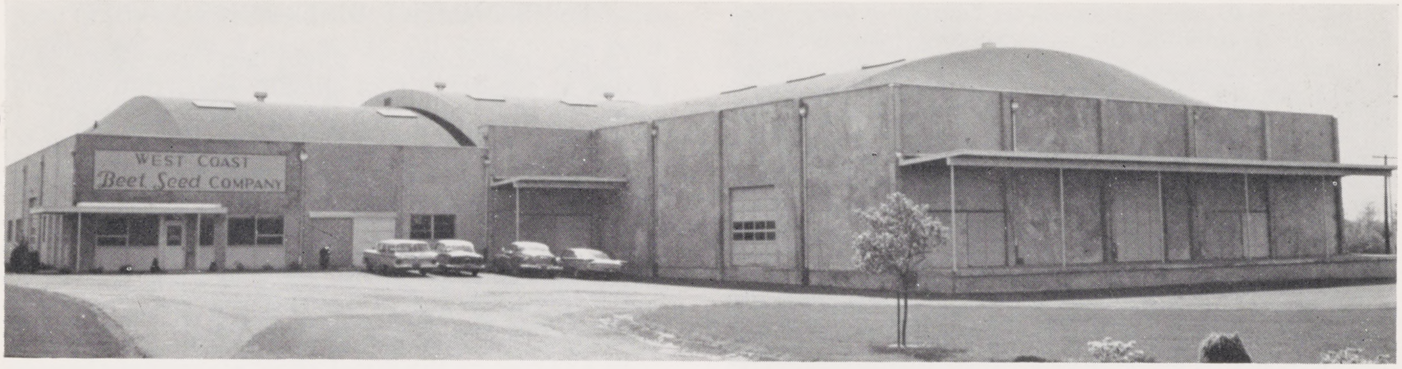
Seed varieties developed by the government were increased and then released to West Coast Beet Seed Committee, which contracted with the Farrar-Loomis Seed Company of Hemet, California, and growers in other areas for the seed supplies requested by the individual companies. As new varieties developed it was found that some of them responded better than others to the colder conditions in Oregon and two distinct areas of production were established. West Coast Beet Seed Committee supervised the growers in the Oregon area and contracted with Farrar-Loomis Seed Company for acreage in Southern California.

WEST COAST BEET SEED COMPANY FORMED

With the start of World War II it became apparent that the beet sugar industry in the United States would have to produce the entire seed supply and not just the curly top resistant varieties. Sugar companies east of the Rockies requested seed supplies from West Coast and it was felt advisable to form a corporation. In 1940 the West Coast Beet Seed Company was incorporated in Oregon to carry out the functions of the old West Coast Beet Seed Committee. The shareholders of this corporation are all of the principal beet sugar companies in the United States.

The newly formed organization continued the work of the old committee on an expanded scale, and today is operating in much the same manner. Individual companies request the number of pounds of seed they wish to have grown, and either supply the stock seed resulting from their own research, or drawn from government varieties maintained by West Coast Beet Seed Co. When most of the sugar companies were using government varieties, the seed of a particular variety would be pooled and then distributed to each company based on its proportion requested. Today, with many companies growing their own varieties the seed company must find individual fields which are isolated from other varieties. The entire production of that field is reserved for the company requesting the seed.

After Spreckels Sugar Company's agricultural research organization has tested a beet variety and is ready to increase it, a few ounces of seed are planted in a small plot of land in someone's home garden where the supply of seed is increased. Seed grown on this small plot is again increased on a five or six acre



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AT SALEM, Oregon, the main plant of West Coast Beet seed company serves to clean and store each season's seed production, and is headquarters for the planting, growing and harvesting of most of the sugar beet seed planted in the Western States.

field. This field is carefully supervised throughout the growing season. The resulting seed supply is enough for us to grow the variety commercially for several years and insures a uniform variety during this time. We furnish from this stock seed the amount required to plant the acreage of the variety requested by us each year. While the seed grower contracts with West Coast Beet Seed Company, his entire output is reserved for Spreckels Sugar Company.

While the Hemet area was an excellent seed producing area for many years, as more non-bolting varieties were developed certain problems arose. Some of the more non-bolting varieties produced relatively little seed. Farrar-Loomis Seed Company made experimental plantings in a number of adjacent areas, and found the Tehachapi vicinity to be an excellent one. In order to insure ourselves against any possible crop disaster, we now follow the policy of having a portion of our seed grown in Oregon and the remainder in Tehachapi.

The field organization of the seed companies supervises the growing of the seed by the individual farmers and helps them with their cultural problems in the same way our fieldmen work with the sugar beet growers.

WHY SPRECKELS DEVELOPS ITS OWN VARIETIES

Aside from the natural development toward the handling of beet seed by the processor, there is another very fundamental reason for his interest in the seed crop. While sugar beets may appear identical in shape and size, there can be wide differences in sugar content and other constituents in the beet itself. All of the new varieties tested, in addition to meeting the standards for yield, sugar content, and disease resistance, must also have qualities acceptable for our factories. It is worth noting that in Europe, where seed is sold by private seed companies, the sugar company allows growers to plant only seed from an approved list tested by the sugar company. It seems to us that a sugar company—both as a service to its growers and in its own self-interest—should devote itself to developing seed varieties adapted to conditions in the specific area in which it operates. A seed company producing seed for a number of companies cannot reasonably be expected to perform this special function.

Because sugar beet seed is of such great importance both to the grower and the processor, the Spreckels Sugar Company has set up its Agricultural Research Department with the prime objective of developing better varieties. We now have four highly trained men in this department. They are Dr. Russell T. Johnson, Dr. Varon Jensen and George Wheatley at our Spreckels Station; and Lauren Burtch who works in the Sacramento and San Joaquin Valley areas. These men develop and test new varieties every year and evaluate them for each district. While many of these are not significant improvements, the few with outstanding merit are increased for commercial planting.

Such an extensive variety breeding and testing program demands an impressive "work space." At

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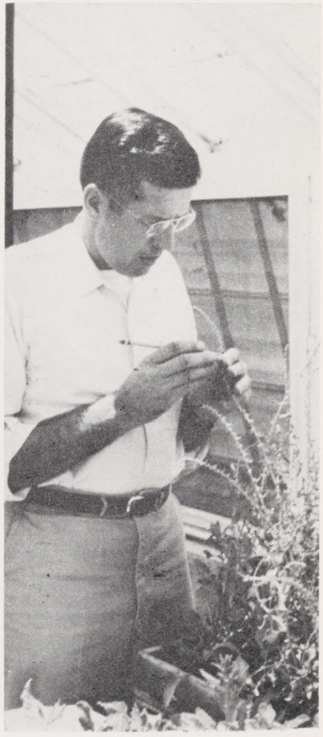
DR. RUSSELL T. JOHNSON heads the Spreckels Agricultural Research program and acts as geneticist for the program.



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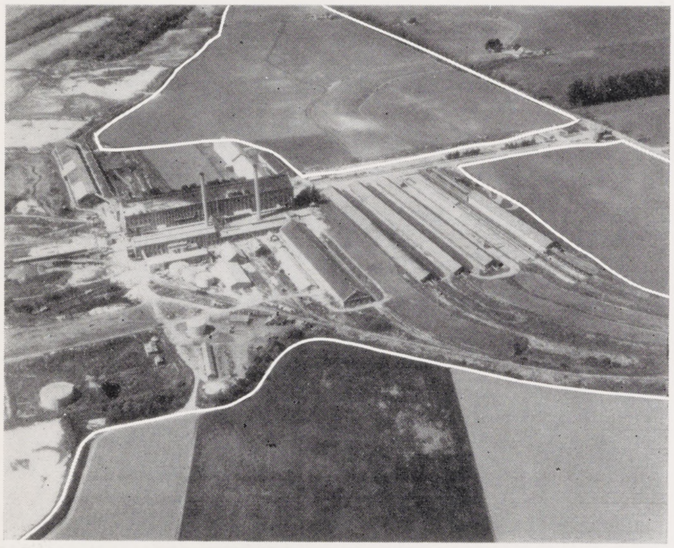
DR. VARON JENSEN is the Plant Physiologist, concerned with the chemical and biological makeup of the sugar beet root.

Spreckels, 320 acres adjacent to Factory I are in use, while at Woodland, the experimental farm occupies 157 acres. A most important additional acreage for test purposes is provided by our growers in every part of California where we contract commercial beet acreage. To simulate a cold climate, we maintain a mechanically refrigerated cold room at Spreckels. Finally, a considerable acreage in observation plots is maintained near Salem, Oregon.



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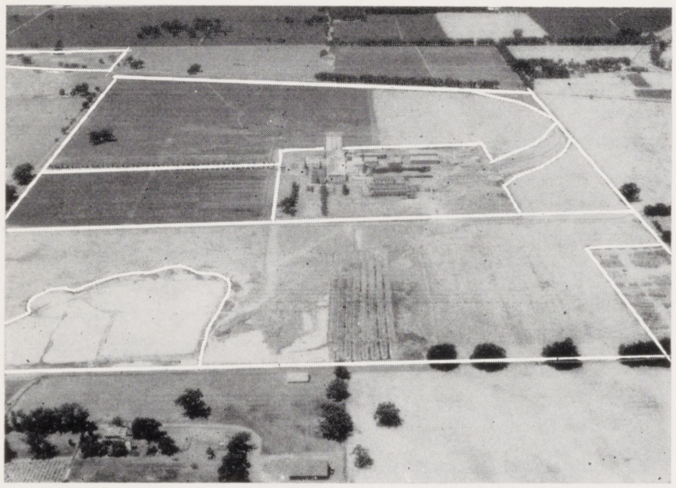
THIS AERIAL photograph shows, outlined in white, the fields which comprise 320 acres of experimental farm land at Factory I, Spreckels.



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AT WOODLAND, there is available for experimental use 157 acres, as shown by the white outlined fields adjacent to Factory III.

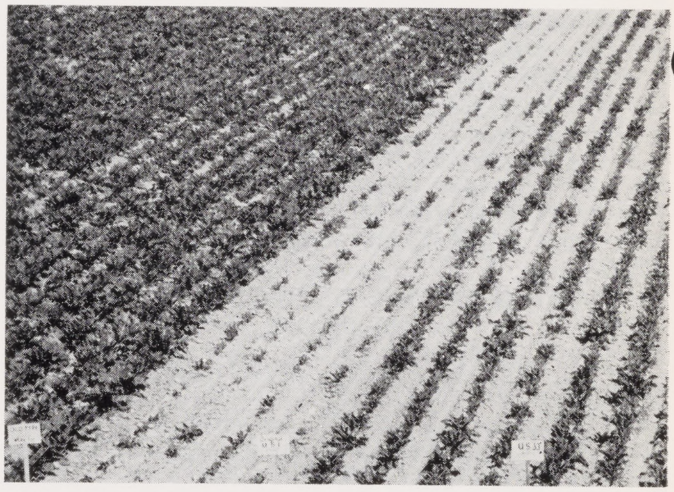
Sugar beet samples from plots over this vast area run into the thousands each year. Sugar percentage determinations for each of these samples are made and recorded; much of the time of the various factory tare laboratories is devoted to these determinations.

Sugar beets are grown for Spreckels Sugar Company under a wide range of environmental conditions. These environmental conditions include different temperatures, different soil types and different climates.

ENVIRONMENT DETERMINES VARIETY

In the coastal valleys where beets are grown there exists, in general, a cool climate with relatively high humidity during much of the beet growing season. In the interior valleys, a climate exists more typical of the desert. The temperatures during the summer are very high and the relative humidity is usually low. Superimposed on this climatic variation are the many different soil types found in both the coastal and interior valley beet growing areas. Each of these factors has some specific effect, or contributes in part to the ultimate development of the beet crop.

In addition to the direct effect of some of these environmental variations, there is the indirect effect which they create by providing conditions more or less conducive to certain diseases. Examples of these are numerous. Downy mildew in sugar beets is a disease which occurs on an economic scale only in the coastal beet growing regions. This is because the disease can persist only at relatively low temperatures and high humidity (including fog, where free moisture is frequently to be found on the leaf surface). Curly top, on the other hand, is a virus disease transmitted by a leaf hopper. This leaf hopper persists under a desert climate. It is, therefore, in far greater abundance in the San Joaquin Valley than in the coastal valleys. While periodic damage occurs from curly top in the coastal valleys, most of the curly top disease comes from leaf hoppers which have flown to the coast from the San Joaquin Valley.



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RESISTANT VARIETIES (left) were relatively unaffected under severe curly-top infection. Old type variety (center) was almost wiped out. Early resistant variety, U.S. 33, (right) showed fair resistance.

Another example is bolting (seed stalk formation) in commercial fields. In sugar beets planted after the first of March, bolting is rarely seen in commercial fields. However, when beets are planted in late fall or winter, bolting can be a serious problem. This is primarily due to the effect of low temperatures during the winter months followed by increasing temperatures and hours of daylight which occur in spring and summer. Such environmental conditions are conducive to the production of seed stalks, yet many of the beets in California are planted in the early winter months.

In California the range of environmental conditions is so great that it is believed that all problems found in beet growing areas throughout the United States can be found here to a greater or lesser degree. This wide variety of environmental conditions is the main reason that a single variety does not perform best in all locations. The variety that performs best for any given area is that variety which is most capable of utilizing the environment to which it is subjected. This phenomenon is referred to as local adaptation. This is nothing new. It has been demonstrated to exist in many crops.

The fundamentals of disease and bolting resistance developed by scientists with the U. S. Department of Agriculture are of fairly recent origin. Using the strains so developed as a starting point, the Spreckels Sugar Company has been able, by selection and hybridization, to produce the many special varieties now available for the specific needs of each beet grower.

OBJECTIVES OF A VARIETY DEVELOPMENT PROGRAM

It has been said that a problem well stated is a problem half solved. Thus, a statement of the objectives of a variety development program goes far toward successful execution of the program.

The environmental differences underlying the need for new varieties have been discussed. A summary of these differences may be outlined as follows:

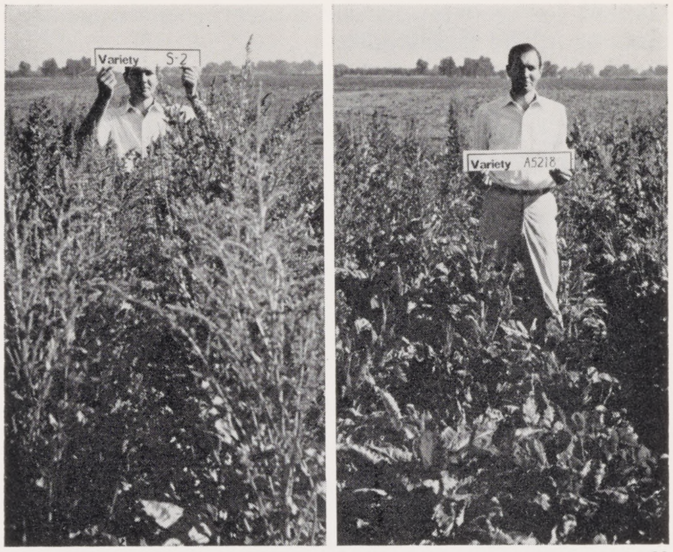
1. Geographical Influences on Diseases.
   a) Curly top in Central Valleys.
   b) Downy Mildew in Coastal Valleys.
   c) Cercospora leaf spot in Northern Sacramento Valley.
2. Climatic Influences on Bolting.
   a) Early planting at temperatures which induce bolting.
   b) Overwintering, with bolting accompanying rising temperatures in springtime.
3. Economic Influences.
   a) Limited acreage, necessitating maximum tonnage yields.
   b) Processing costs, necessitating maximum sugar percentage.
   c) Net income to growers, necessitating maximum sugar per acre.

The first two headings define the objective of developing varieties to meet a wide range of regional and seasonal requirements.

The third heading defines the objective of maximizing yield and sugar content in all varieties.

DEVELOPING A NEW VARIETY

A new variety of sugar beet, like a new variety of any other plant, does not just happen spontaneously. Many experimental steps in selection, evaluation and seed increase must precede the issue of any new seed variety. Some of these steps might well be briefly described here.



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TWO VARIETIES, carried overwinter.

S-2 was a bolting-resistant variety when introduced in 1951. But there is always room for improvement as shown by the experimental variety at the right.

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IN OREGON, small beet roots of promising new varieties are harvested from experimental plots (left) and transplanted to isolation plots for seed increase. If the resulting seed is proved to retain desirable characteristics, it is used as stock seed for increase in commercial plantings.

In the development of a new variety, the initial step is the selection of desirable roots which will act as the ancestors of the contemplated new strain. These roots are selected for size, disease resistance, or other special characteristics. Each root in this initial selection is sampled to determine the individual sugar content. Some idea of the magnitude of this task is evident from the fact that over 2,500 individual roots are so processed every year in the Spreckels seed breeding program. Only those roots having maximum sugar content are retained. The selected roots are then planted for seed production either in small, isolated plots or in the greenhouse.

When seed from each root is harvested, it is planted in one or more of several large evaluation plots. The location of these plots is such that all of the desired characteristics may be evaluated. Here our plant breeders carefully observe the growth of these numerous strains through an entire crop year. They have the task of eliminating many of these strains which may lack some of the most desirable characteristics prior to carrying on more extensive and costly testing. This step is necessary to insure the continued high degree of disease resistance, resistance to bolting, or other selected characteristics. At this stage of testing, from 1,000 to 1,500 strains are observed and evaluated each year. Of this large number, only a tiny fraction come up to the rigorous standards established.

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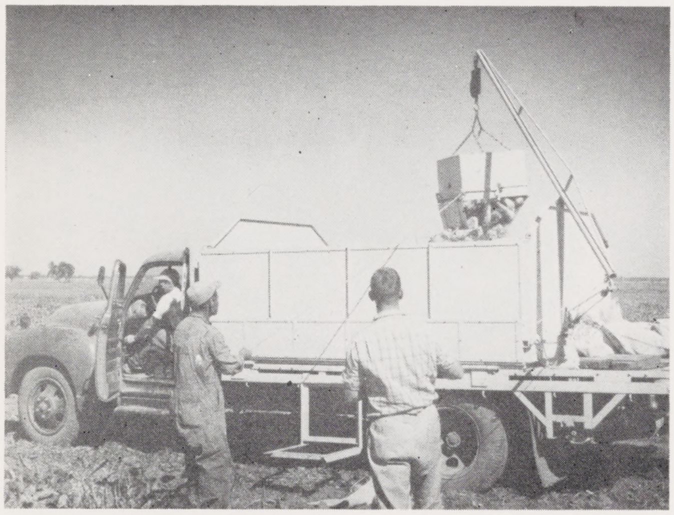
PLANTING variety plots is done with Spreckels-designed hand planters affixed to the cooperating grower's planter sled.



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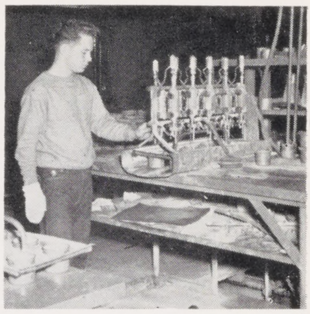
HARVESTING variety plots is a big job—40 to 50 plots yield root samples from up to 160 trial varieties. Thus up to 8,000 samples must be harvested, weighed and analyzed for sugar and purity each year.

EACH YEAR, many thousand of root samples from variety plots have to be analyzed for sugar content. This is done in any of the factory tare laboratories.



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The seed of those potentially new varieties is then increased on a slightly larger scale to provide sufficient seed for more widespread testing. At this point, plots are grown in growers' fields for evaluation under actual beet growing conditions. The cooperation by the many growers who give freely of their land, time and implements is actually responsible for our program's success. Without this cooperation we would never have achieved our present varieties. These plots are usually referred to as variety trials, and this is the stage at which potentially new varieties get the "acid test." They are grown in replicated tests in various locations throughout our beet growing districts. In these tests, the new strains are compared with other experimental varieties, and with current commercial varieties.

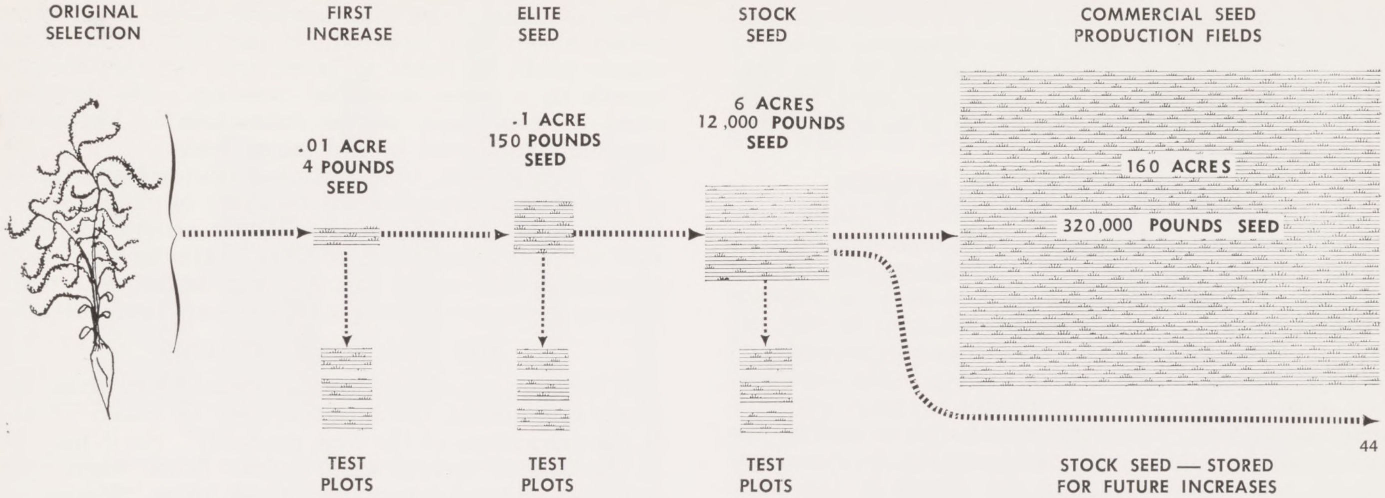
We evaluate from 150 to 200 potential new varieties each year. From 45 to 50 variety plots, located throughout our beet growing districts, are required to conduct these tests. Most experimental strains fail at this stage of testing. They fail because they do not perform any better than the commercial variety or other new experimental varieties under actual growers' conditions. The occasional new strain, however, that is demonstrably superior to the commercial checks is increased for further testing and small scale commercial use. At this time, strip plantings are made in all of the areas where the new variety may be used. Growers and company field men have a chance to observe the new variety in comparison with the variety they have been growing. If the new variety passes this test, it then becomes a commercial variety and is used as a standard against which successive new experimental strains will be tested.

It is important to note that when one of these experimental strains has been selected for commercial seed increase it will be approximately three years before sufficient seed can be made available to growers for commercial plantings. This is the time necessary to build up our seed supplies, to the point that commercial amounts of seed become available.

DESCRIPTION OF CURRENT VARIETIES

As a result of the efforts expended in developing varieties for specific conditions, five open pollinated varieties had become available to Spreckels growers by 1955. These five varieties did a fairly good job based primarily on resistance to diseases and bolting. No sooner had these varieties become established, however, than we again became involved in the transition from those open pollinated varieties into newer,

(Continued on Page 24)



HOW BEET SEED IS PRODUCED — from an original selection to commercial production.

SPRECKELS SEED VARIETIES AND CHARACTERISTICS

S-1	An open pollinated, non bolting, multigerm variety suitable for early planting in the coastal area.
S-2	An open pollinated, multigerm variety which has excellent curly top resistance and is moderately non bolting.
S-3	An open pollinated non bolting multigerm variety with excellent curly top resistance suitable for early planting or overwintering in the central valley area.
S-5	An open pollinated multigerm variety with moderate leaf spot resistance for use primarily in the northern Sacramento valley area.
S-102H	A multigerm hybrid with good bolting resistance for use similar to S-1.
S-202H	A multigerm hybrid with relatively good curly top resistance and moderate bolting resistance. Excellent for use in most areas except where extreme curly top resistance or bolting resistance is required.
S-302H	A multigerm non bolting hybrid with excellent curly top resistance. For use in early planting in the San Joaquin Valley. (Available in 1961).
S-201H	A monogerm hybrid that has relatively high curly top resistance and moderate bolting resistance.
S-601H	A monogerm, easy bolting hybrid with very little curly top resistance. A good monogerm hybrid for use where bolting and curly top are not factors.

more productive hybrid varieties. The introduction of hybrid varieties of sugar beets appears to be one of the greatest single genetic improvements in this crop since the development of the sugar beet itself, making possible even better local adaptation of varieties suited to specific conditions.

THE DEVELOPMENT OF HYBRIDS

Until recently, all beets in the United States were grown from open pollinated seed. As mentioned above, we are now in the process of rapidly converting our varieties into hybrids. It might be well to explain what is meant by open pollinated and hybrid varieties. Open pollinated varieties are reproduced by planting seed of the desired variety in the seed field and allowing the resulting plants to pollinate each other at random. The sugar beet pollen is readily disseminated by wind, and consequently cross-pollination is accomplished among the plants in the field; hence the term: open pollinated varieties.

Hybrid varieties of sugar beets are produced in a very different manner. Hybrids are produced under conditions of controlled pollination. This is accomplished by developing a strain of beets which will produce no pollen. Such strains are called *male sterile* strains. Plants of such a strain must receive pollen from another plant in order to set fertile seed. Plants used to provide pollen are called pollinators. Alternate strips of these two strains are planted in the seed fields. Any seed set on the male sterile parent is the result of pollen supplied by the pollinator parent, and consequently is a hybrid produced under controlled pollination conditions. At harvest time, seed is harvested only from the male sterile strips. The pollinator strips are destroyed.

Production of hybrid seed on a commercial scale is being done in many crops. Successful corn hybrids have been grown for many years. The method of producing a hybrid in corn has been to plant alternate strips of the strains selected as the seed, or female, parent and the pollinator parent. When the tassels, or pollen bearing structures, develop they are removed from the female parent plants. All pollen in the field then comes from the pollinator parent (retaining tassels). In this case, ears are harvested only from the female parent plants and seed on ears from these plants is hybrid seed.

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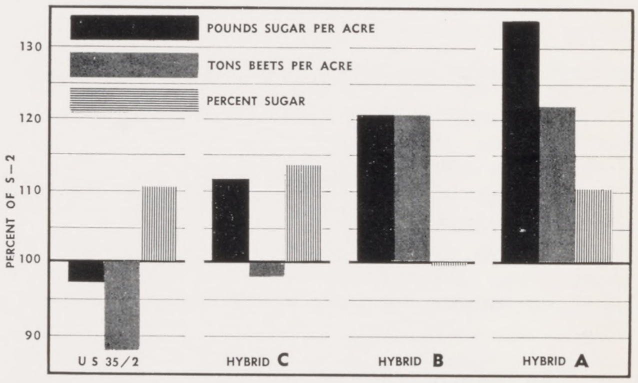
HYBRID in the making. Flowers of the pollen-bearing plant (left) and of the male-sterile plant (right) are brought together in the protective bag.

In beets there is no practical way to remove the pollen-bearing structures, as can be done in corn. The production of hybrid sugar beet seed on a commercial scale required the development of male sterile strains. This was accomplished by the discovery of certain types of sugar beet plants which failed to produce pollen when they flowered. It was found that these plants could be made to breed true for this characteristic by a series of special crossings. The development of this male sterile characteristic has made possible commercial hybrid sugar beets.

Dr. F. V. Owen, of the United States Department of Agriculture, reported the discovery of male sterility in sugar beets, and in 1945 offered a genetic explanation of the inheritance of this characteristic. The problem of converting this research finding into commercial seed production has taken more than a decade.

THE VALUE OF HYBRIDS

Whenever something new supplants something already established, the question may be asked "What is the advantage of the new product?" So it may be in the case of hybrid sugar beets. Some sugar beet hybrids exhibit an increased vigor, often referred to



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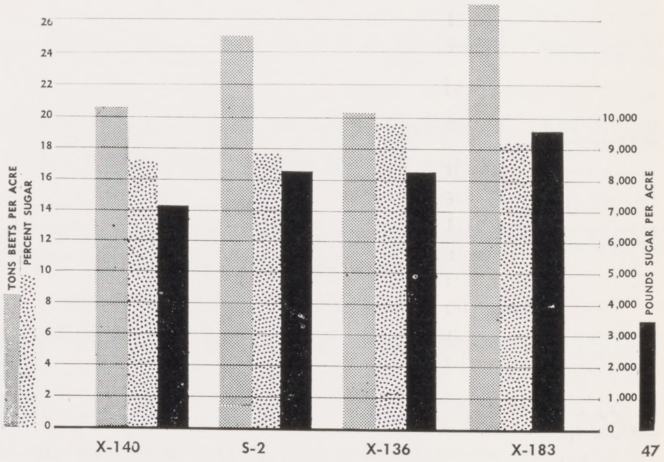
HYBRID VARIETIES are not necessarily better in either sugar or tonnage than open pollinated varieties. The earlier variety US 35/2, while somewhat better in sugar, was very much worse in tons per acre and in pounds sugar per acre. Hybrid variety C was better in percent sugar, but worse in tons per acre, although better in pounds sugar per acre. Hybrid B was markedly better in tons beets per acre, but slightly worse in percent sugar. Hybrid A is considerably better in percent sugar; very much better in tons per acre, and strikingly better in pounds sugar per acre. This may very well be a future commercial variety.



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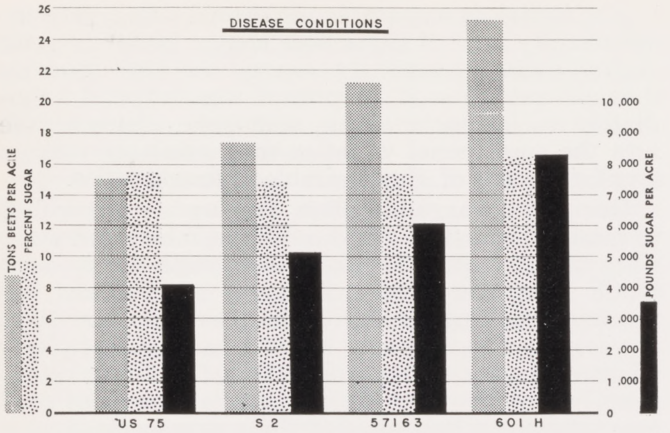
ANOTHER COMPARISON to illustrate that hybrid varieties are not necessarily better than open-pollinated varieties. Hybrid X-140 is lower in tonnage, sugar and sugar per acre than open-pollinated S-2. Hybrid X-136 has high sugar, but low tonnage and reduced sugar per acre. Hybrid X-183 is superior in both tonnage and sugar; consequently markedly better in sugar per acre.



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DISEASE RESISTANCE may be low in otherwise good varieties. US 75 and S-2 suffer severely in plots infected with root rot. Experimental hybrid 57163 is better; commercial hybrid 601H is virtually unaffected. These results are from replicated plots near Stockton.

as hybrid vigor. Most of the advantage of hybrids in sugar beets appears to be in the form of increased yield. A few, however, demonstrate the ability to develop roots with a higher sugar content. Some rare combinations produce hybrids which demonstrate improved yielding ability in addition to increased sugar content. The hybrids now available to Spreckels growers have averaged approximately 15 percent higher sugar production per acre than the open-pollinated commercial checks with which they were compared over the past three years of testing. This increase in production has been the result of approximately 11 percent increase in tonnage and a 4 percent increase in sugar content. The results of these studies have been very encouraging to the use of commercial hybrid sugar beets.

Our belief in the value of hybrids is reflected in the use of them by our growers. In 1958 only small strips in widely separated areas were planted to hybrids. In 1959 approximately one-half of our commercial acreage was devoted to hybrid varieties, and within the next few years that percentage will approach 100 percent of the seed used by Spreckels beet growers.

Sugar beet hybrids are no universal panacea, nor do they involve any magic. They are simply crosses between strains of beets which can be duplicated. Widespread testing is required to pick out those hybrids which are best for specific areas. Those identified as superior to the current commercial varieties are increased for commercial utilization. The continuing problem in the production of hybrid sugar beets at this time, then, is to identify and isolate those strains which produce the best hybrids and increase them for commercial exploitation.

Hybrids do not possess characteristics absent in either parent, such as disease resistance and bolting resistance. For that reason, all the desirable characteristics possessed by the open-pollinated varieties that have formerly been used must be continued in hybrid varieties in order to insure the production of a good crop from hybrid seed.

The hybrids we are now producing are not the ultimate in sugar beet varieties. Certain refinements would be desirable, as well as the improvement of yield and sugar content. The current hybrids, however, do represent an improvement over past varieties and one with which we are well pleased.

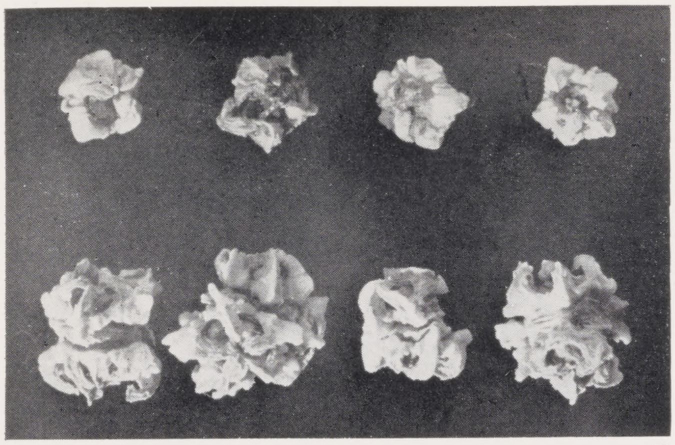
OTHER TYPES OF HYBRIDS

The type of hybrid we are now using is the male sterile hybrid mentioned above, and is the type in commercial use or in the process of development throughout the United States. During the time that so much of the plant breeding effort has been put into the development of these hybrids in the United States, another type of hybrid has been developing in Europe, referred to as a *polyploid*. Polyploidy is a condition in which there occurs an increased number of chromosomes in each cell. Polyploid hybrids offer some genetic possibilities not available with the normal male sterile hybrids in current use in the United States. This is due to the increased number of combinations of chromosomes possible with polyploids as compared with the normal, or diploids, that we are now growing. Much of the desirability of the polyploids may be due to the same phenomenon as the desirability in our hybrids; namely, hybrid vigor. This facet is now being studied to better understand the relative values of diploids and polyploids. These European hybrids have found ready acceptance among growers in Southern Europe. The Scandinavian countries and England use very little polyploid seed at present, but use of it will probably increase rather rapidly.

Now that most of the mechanical difficulties of producing male sterile hybrid seed have been overcome, commercial hybrid seed is a reality. However, we can further refine or expand some of the developmental processes in producing hybrids. One phase upon which we are now embarking is that of combining polyploidy with the production of male sterile hybrids in an attempt to combine the best aspects of both types of hybrid. By use of both male sterility and polyploidy, completely hybrid polyploids can be produced for commercial use. If this type of hybrid demonstrates its superiority in field tests, it will be another step in a continuing process of developing better varieties of beets for Spreckels growers.

All of these new techniques are being tested by our research staff and our men spend a part of their time conferring with other scientists, universities and commercial concerns on the latest developments. In 1959 Dr. Johnson spent some time in Europe studying the methods of plant breeding used in those countries so that we can be sure we are taking advantage of all sources of information. We also test seed from foreign suppliers to satisfy ourselves that we are still making available the very best varieties.

While some of these foreign varieties look good in tests, when they are subjected to disease conditions it becomes apparent that the varieties developed in this country with the aid of U.S.D.A. researchers have done a great deal to protect the grower from serious damage by crop failure.



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WHEN MONOGERM SEED was first introduced, the seeds were very small and flat (upper row). Normal multigerm seeds (lower row) emphasize this comparison. Newer varieties of monogerm seed are both larger and plumper — demonstrating one of the characteristics which had to be overcome in the monogerm seed breeding program.

THIS IS AN EARLY photograph of one of the first sugar beet plants which yielded monogerm seed.

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MONOGERM SEED

About 12 years ago, the discovery of a few beet plants having monogerm seed was made in an Oregon sugar beet seed field by Dr. V. F. Savitsky, working for the U. S. beet sugar industry. When it was discovered that these plants possessing monogerm seed would breed true, it stimulated a tremendous interest in the development of varieties of beets with monogerm seed. The normal seedball found in sugar beets generally contains from two to five embryos per seedball. Attempts to produce a single germ beet seed by shearing these multigerm seeds to a size which contained a single true seed were made in 1941. These experiments led to the widespread use of sheared (and later, decorticated) seed. The severe processing needed to produce a single-germ seed, however, damaged the seed to an extent that emergence was impaired. Thus, singling a seedball by mechanical processing was not satisfactory. With the discovery of the inherent type of monogerm-bearing beet plant it appeared that varieties could be produced which would naturally have only one seed per seedball.

The primary advantage of monogerm seed is as an aid to mechanical thinning. By space planting seeds with a single embryo, it is reasonable to expect the emergence of a uniform stand of single seedlings. These stands can be reduced to the desired level by use of mechanical thinners, leaving mostly single seedlings.

The initial monogerm as discovered was a very unsatisfactory type of sugar beet plant. About the only desirable characteristic it possessed was that of having a single-embryo seed. A project was initiated immediately to incorporate this monogerm characteristic into the commercial varieties then available without sacrificing any of the desirable characteristics.

Our policy was, and still is, that we are not willing to sacrifice desirability in our current multigerm varieties just to produce monogerm sugar beet seed. Until 1958, very few monogerm strains had appeared promising in our extensive trials. In 1958, however, and increasingly in 1959, monogerm hybrids appeared to equal the production of our best multigerm hybrids and we are now in the process of commercially increasing some of these monogerm strains. A small amount of monogerm seed was available in 1959 and slightly more in 1960. Within the next few years, there will be sufficient monogerm seed to satisfy the needs of any growers who desire it, and it will possess in full measure all of the essential characteristics; resistance to diseases and bolting, plus high tonnage and high sugar content.

PRODUCTION OF COMMERCIAL SUGAR BEET SEED

Sugar beets are biennial plants. This means that beets grown for seed produce leaves and roots the first season, then produce seed stalks, flowers and seed the second season.

To assure the flowering and seed producing processes, certain conditions are necessary. The first year in which the seed is planted for increase (in July or August), conditions for rapid growth of the beets are necessary. This growth period should be long enough for the beet to become well established before freezing weather occurs. The period of rapid growth should be followed by a gradual change to lower temperatures. During these low temperatures, growth is retarded and the plants remain in a semi-dormant state for a period of time. With the increasing temperatures and day length accompanying spring, conditions are again more conducive to growth. With the resumption of growth in the spring, seed stalks begin to appear which subsequently bear flowers and seed.

To prevent pollen from blowing from one variety to another and thus contaminating it, adequate isolation between fields is most important. This is another reason why seed fields are separated by distances of several miles, and preferably by intervening hills or forests.

Even more important than the contamination by stray pollen is the knowledge that the stock seed issued for the increase is properly identified and this identity carries through to shipment to the sugar company. This requires the utmost care in labelling and handling of all seed lots. In addition, the seed company fieldman works constantly with the seed grower on weed control, insect control and all cultural practices so that the seed produced is free from weed seeds and has high germination. Fields are rogued to minimize the number of off-type beets.

In August, 12 or 13 months after planting, seed is harvested from each field separately and given a lot number. This lot number identifies the seed variety and the field from which it came, and remains with that particular seed throughout the subsequent cleaning and processing operations.

Each whole seed lot is sampled as it is threshed, and the sample forwarded immediately to our research department at Spreckels. Here the germination percentages are determined, along with the range of seedball sizes. These tests are run to determine if the seed lot, after processing, will meet the high standards of our company.

An important additional test has been devised by Spreckels to reveal any loss in bolting resistance. These tests have uncovered occasional seed lots with some evidence of contamination. Such lots have been destroyed.

SEED PROCESSING

Carload shipments of seed are made to the Spreckels Sugar Company processing plant at Spreckels, after cleaning and bagging at the warehouses of West Coast Beet Seed Company or Farrar-Loomis Seed Company.

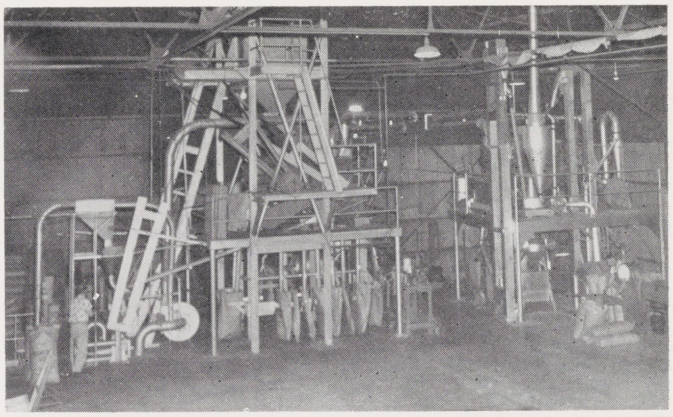
The whole seed as received has a wide size range, from approximately 7/64 to 20/64 inch in diameter. To provide a uniform product, a decortication process is employed. The seed is run through a decorticator, which consists of an abrasive wheel rotating against a rubber surface. The larger the seed, the more it is "polished."

Attention is called to the fact that decortication, or polishing, is not the same operation as shearing or segmenting. The latter operations break seedballs apart; decortication gently polishes away some of the outer corky layer of the seedball without harming the embryos. Thus the seed is made more uniform in size and more nearly spherical in shape.

After the polishing treatment, screens are used to select that portion of seed between 7/64 and 10/64 inch in diameter. By use of an air classifier (aspirator) dust and light seeds are removed. Seed which is reduced in size to less than 7/64 inch is discarded and seed over 10/64 inch in size is recirculated and polished down again. Care is taken to keep from processing the seed too severely, thus to prevent damage that would adversely affect germination and emergence. Detailed checks are made on the germination and emergence percentages of each lot of seed after it is processed.

Each processed lot of seed is sampled to make sure it is within the proper size range. Germination tests are run by the blotter method and an emergence percentage is determined by planting adequate samples in soil. This simulates a field planting in that the beets have to show the ability to produce an elongated primary root, as well as cotyledons, befoer being counted for determining this emergence percentage.

All seed is treated with fungicides and insecticide—chemicals which disperse into the soil adjacent to the seed after planting. These chemicals afford a fairly high degree of protection against the soil-borne fungus organisms which cause damping-off, and wireworms which attack the seedlings underground.



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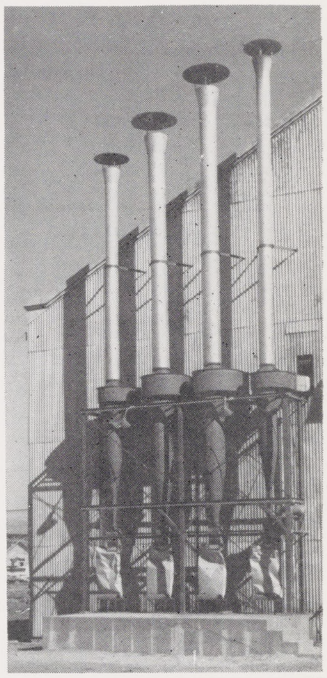
ABOVE — the seed processing station at Spreckels contains duplicate installations involving airlifts, screens, aspirators, decorticators and spray treating units.



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RIGHT. The exterior, with its dust collection and disposal system.

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17,036 POUNDS OF SUGAR displayed by John Domingos; he produced this much sugar on each of 21.5 acres planted with a Spreckels hybrid variety suited to his particular environmental conditions.

Seed treatment has been less than 100% effective in preventing damping-off. The reason is mainly because the chemicals, however effective, do not disperse through a great enough volume of soil to assure complete protection. But continual improvement is being made in the potency of seed protectants, and Spreckels Sugar Company uses those materials which have most recently proved their superiority.

After the seed is bagged in fifty pound paper bags and properly labeled with variety, lot number, germination and other pertinent data, it is ready for shipment to the sugar beet grower. To make the issuance of the seed more convenient for the grower, the company has set up a number of distribution centers in all of its growing areas. The supply of seed is carefully controlled at all of these points to have adequate supplies and also to be sure that no variety not suitable for the area or the particular time of planting is on hand. This minimizes the chances of any grower inadvertently being issued the wrong variety.

When plantings are completed, any unused seed is returned to our Spreckels plant where it is recleaned and rechecked for germination and quality to be sure it will meet the company's standards when issued the following year. The Spreckels Sugar Company has established the policy of not accepting opened bags in return because of the chance that some seed of another variety might be in the bag. This policy was made in order to protect the grower against getting a wrong variety, and while it may seem arbitrary to not take back a bag with only a few pounds removed, it is the only safe policy we can follow.

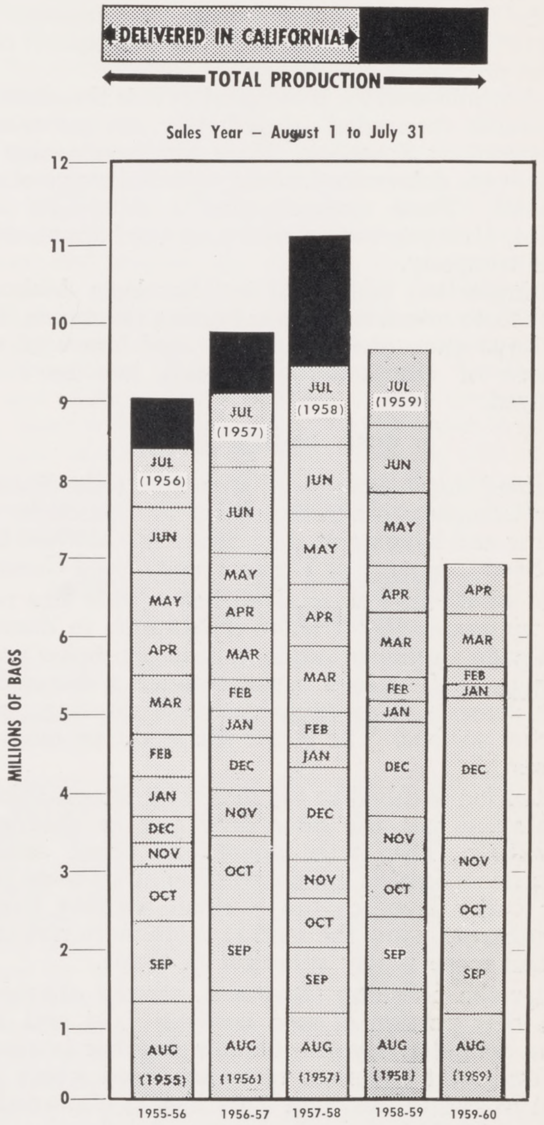
IN CONCLUSION

This discussion of the Spreckels Beet Seed Program has been long—perhaps a tedious reading task. Yet so great is the scope of the program, that we who have compiled the material feel that we have only skimmed the surface.

Our earnest hope is that we have explained some of the steps which led to our present seed varieties, and which will carry us to yet greater achievements in variety improvement. Our present varieties have unquestionably contributed to the record-shattering crop of 1959; yet we expect to see this record fall in the near future.

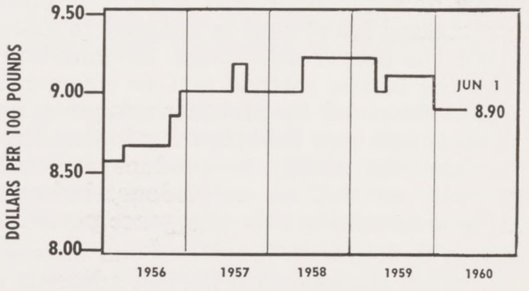
The Spreckels Sugar Company is proud of its seed breeding and handling program, a program designed to give our growers the best possible seed in the best possible condition. To accomplish this has taken the cooperation of many people, including USDA scientists, University of California personnel and growers themselves. The wholehearted cooperation by growers in offering their fields for test purposes has been most gratifying and helpful to us and without this help we would be many years behind our present position.

PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.

AUSTIN ARMER, EDITOR SPRECKELS SUGAR COMPANY WOODLAND, CALIFORNIA

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PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

SPRECKELS SUGAR BEET BULLETIN

VOL. 24 JULY - AUGUST, 1960 NO. 4

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ANOTHER CAMPAIGN

has begun. Processing of sugar beets can be
carried on at maximum speed only
when the beets are
WELL TOPPED
TRASH-FREE
DIRT-FREE

Harvest supervision will do the job—see page 30.

WHY DELIVER CLEAN BEETS?

By WALTER BUCKINGHAM, *District Manager*
Spreckels Sugar Company

THE COSTS OF FARM operations continue to rise higher and higher. But considerable money can be saved by the grower if he will deliver sugar beets free of excessive dirt and trash. The condition of the crop delivered is the basis for the amount of payment that he receives. Trash and dirt result in a higher hauling cost, plus a larger tare deduction. When a grower has to pay hauling costs on material on which he receives no return, it is only sound business to reduce the amount of the excess to a minimum.

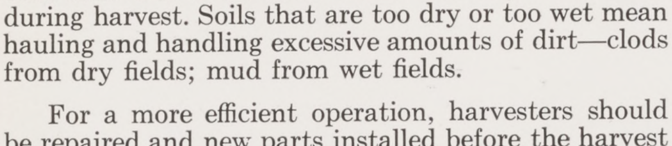
The delivery of too much crown on the beet reduces the amount of return to the grower. Part of the crown is deducted as tare. The crown is low in sugar and high in impurities, which tends to lower the average sugar percent and also lower the rate per ton he receives from the processor.

Excessive trash and dirt reduce the tonnage of sugar beets that a factory can process in a day. This, in turn, also reduces the tonnage of sugar beets an individual grower can deliver. Trashy and dirty beets cause unnecessary delays at both our loading stations and the factory.

Growers can improve their clean beet percentage by applying their last irrigation at the proper time, so that soils will not become either too dry or too wet during harvest. Soils that are too dry or too wet mean hauling and handling excessive amounts of dirt—clods from dry fields; mud from wet fields.

For a more efficient operation, harvesters should be repaired and new parts installed before the harvest season begins. Harvesters are being improved continually by the machine manufacturers. Some new innovations can be adapted to old machines to promote cleaner harvesting. Machines should be operated at a reasonable speed to get maximum return per acre. Machines traveling at high speeds cause more of the root to be left in the ground, and it is also difficult to obtain an even cut on the crown, leaving too much foliage on the beet. Experienced operators are a must to good harvesting. Growers should make sure mechanical topping devices are kept sharp and adjusted.

Later cultivation will help to reduce weeds at harvest time. Roto-beaters should be used in extremely trashy or weedy fields. It is essential that each grower employ harvest methods suitable to his own particular conditions. Close supervision will help to harvest cleaner beets. This means more profits for growers and less time necessary to harvest their sugar beet crops.



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CLEANER BEETS FOR DISTRICT 2

By R. S. LAMBDIN, *District Manager*
Spreckels Sugar Company

THE MAJORITY OF OUR growers in this district are doing a fine job of growing and harvesting beets and we wish to express our appreciation and commend them for their efforts. However, there are still a few who bring in loads of dirt, trash and beets that are almost impossible to handle. The old saying, "One bad apple can spoil the whole box" certainly fits the beet business. It particularly fits the situation when one grower persists in delivering loads of beets which are poorly topped, or which contain unreasonable quantities of trash or soil.

A trashy, dirty load of beets is not only a problem to us as processors because it creates a number of slowdowns in our operations; it is also a costly problem to growers because our slowdowns eventually revert back to all of them.

There are improvements that can be made at our loading stations and at our plants. This is our responsibility, and each year we make improvements to render more uninterrupted service and to perform the best cleaning job with minimum damage to beets.

The farm machinery manufacturers make available new machines and improvements on old ones that help materially, but the basic problems encountered in delivery of clean beets begin when the grower plants his crop. The point I would like to make to you, as a grower, is that your problems in growing and harvesting clean beets can be minimized when you employ the fundamentals of good farming.

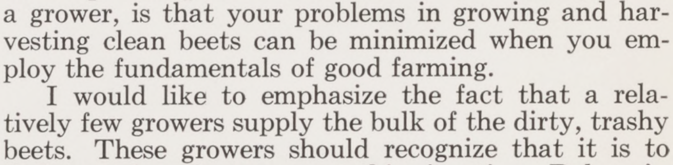
I would like to emphasize the fact that a relatively few growers supply the bulk of the dirty, trashy beets. These growers should recognize that it is to their own benefit to correct this situation. Delays in receiving beets will be reduced and more tons of clean beets can be processed.

EVERYONE PAYS

By DAN L. DIETER, *District Manager*
Spreckels Sugar Company

SINCE THE DEVELOPMENT of mechanical harvest during the past decade, some growers have come to the conclusion that it is gainful for them to deliver beets to the factory with as much top and crown as they can possibly "get by" with.

The truth of such a philosophy remains a matter of conjecture as far as actual gain to the grower is concerned. The fact does remain, however, that such a practice causes extra expense to several persons or groups involved in the harvesting and processing of



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sugar beets. If such a grower is making this gain by delivering trashy, poorly topped beets, he is making it at the expense of neighboring beet growers, the truckers and the processor who, in the end, is supposed to make sugar from this heterogeneous mass that some growers deliver under the name of beets.

Let us consider a load of poorly topped, trashy beets and list all of the persons who are affected financially by the delivery of such a low quality product.

Number one is the grower himself. It is a simple fact that it cost this grower more to haul a ton of clean beets from a machine harvesting 85% clean beets than from a machine turning out 95% clean beets; 10% more.

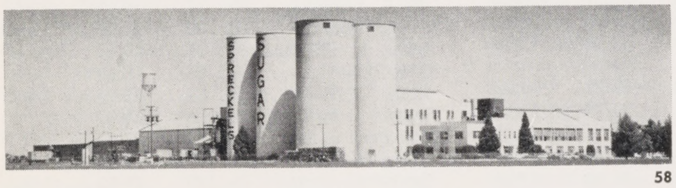
Number two on the list is the contract hauler, if the grower is not delivering such beets in his own equipment. Innumerable beet beds have been damaged or wrecked when a load of poorly topped beets would not "flow" out of the box, but were ejected in practically a solid mass of beets, leaves and tops. Such a mass has been seen on, numerous occasions, to break the hinged side of the box, break cross members, or even tip the entire bed into the beet hopper.

Number three is the processor; his operating costs rise and his daily slice diminishes. Poorly topped beets require more labor for unloading as they have to be poled and kicked out of the bed. More costs are incurred to haul the excess trash from the trash catchers. The tops that slip by into the mill cause lowered purities, higher filtration costs and eventually lowered slice with increased overall processing costs.

Number four on the list are the other growers who are delivering to the station where the poorly topped beets are being delivered. Their costs are increased because of delays in unloading. Truck drivers' wages have to be paid, even when they are sitting in line waiting to be unloaded. Harvester labor costs per ton are increased by the machines and crews standing idle while delayed trucks are absent from the field.

In addition, because of lowered quality of deliveries, it has actually become necessary for the company to install more effective screening equipment at all receiving stations. It is possible to adjust these screens to be rougher on beets and cause some loss to growers by removing chips, tails and small beets. With the increase in volume of clods, tops and trash, it would be almost an impossibility to flume the beets if old style cleaning equipment were in use.

A major portion of our growers pride themselves in delivering a well topped, clean product, and this group is to be commended. We in the Agricultural Department at Woodland are grateful to these growers, and it is certainly unfair to force this group to share in the extra expense caused by the practice of a few growers in delivering trashy beets.



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DON'T BLAME THE HARVESTER

By AUSTIN ARMER, *Agricultural Engineer*
Spreckels Sugar Company

THE THREE DISTRICT MANAGERS have asked growers to deliver well topped beets, reasonably free from trash and dirt. Most growers do this of their own accord; but there are some who will say that weedy fields, high crowns and hard ground make it impossible for any harvester to top properly, and to deliver beets with little trash and few clods.

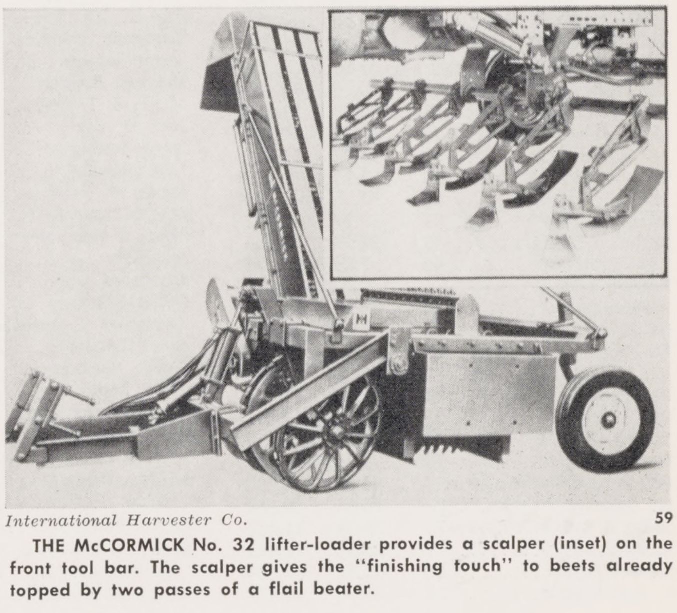
It is not impossible. It is not even difficult. All it requires is supervision of the harvesting operation by a responsible person of reasonable mechanical ability and a determination to accomplish a good job of beet harvesting. The harvesting machine will do the rest—regardless of its make.

One of the commonest excuses for delivering great quantities of clods in each load of beets is "My Farmhand (Gemco, McCormick, Marbeet) will always harvest a lot of clods when the ground is dry". This excuse is not an acceptable substitute for clean beets. Besides it is only proof that the last irrigation was applied too long before harvest.

Some loads of beets arrived at the receiving stations with very little evidence of having been topped at all—The excuse is "What I lose in tare is less than it would cost me to top them better". A fine excuse—except that the factory can't make sugar from untopped beets.

There is some reason to believe that purchasers of digger - loaders (Farmhand, Gemco, McCormick) do not realize that these machines work only after a Rotobeater or equivalent rubber flail topper has been over the field twice—once in each direction. Furthermore, there must be flails in good condition on the machine.

(Continued on page 36)



International Harvester Co. 59

THE McCORMICK No. 32 lifter-loader provides a scalper (inset) on the front tool bar. The scalper gives the "finishing touch" to beets already topped by two passes of a flail beater.

The Honor Roll For 1959

DISTRICT 2 — MANTECA DISTRICT 3 — WOODLAND

In the 1959 crop year, Spreckels growers in all districts produced crops which outyielded every previous record. The harvest of the 1959 crop in District 1, Salinas, was completed in the fall of 1959, and reported in the March-April issue. We proudly publish here the names of Spreckels growers whose contracts yielded over 25 tons per acre in Districts 2 and 3 during the fall, 1959 and spring, 1960 harvest periods.

R. S. Lambolin 60

AUGUST and STEVE PELLEGRI
Top Growers in District 2

DISTRICT 2—MANTECA

OVER 40 TONS PER ACRE

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
A. Pellegri & Son	21	48.82	15,095
*Thorsen & Del Soldato	31	45.14	13,723
Johnny A. Dasso	30	44.87	13,640
Albert J. Perry	65	44.50	12,060
Brannan Farms	17	43.75	13,711
*Murata Brothers	14	43.39	12,288
*Roger L. Remonda	27	43.20	13,288
*Norman Thorkelson	43	42.99	11,685
Tom Hiraga	24	42.95	12,919
Lind Brothers	14	42.19	12,294
Hengst Farms, Inc.	42	41.85	12,371
Nishida Brothers	33	41.58	12,665
H. E. Nagata	34	41.38	12,447
Tony A. Sanchez	50	40.80	13,448

30 TO 40 TONS PER ACRE

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Tom Sanchez	69	39.55	12,355
A. & E. Croce	11	38.88	11,571
M. E. Ables	19	38.62	10,242
Joe Escobar, Jr.	58	38.02	11,064
M. J. Machado & Son	24	37.98	10,171
M. J. Gonsalves	26	37.56	9,998
Oliver Giannecchini	33	37.37	11,921
Pastorino Brothers	48	37.33	11,684
Kiyoi Brothers	45	37.29	12,075
Newhall Land & Farming Co.	128	37.22	10,369
Ishida Brothers	35	37.10	10,989
Ed Thoming	68	36.96	11,206
M. J. Gonsalves	78	36.58	10,433
Robertson & Sons	83	36.44	11,479
Otto F. Muller	25	36.04	11,598
Tony J. Pereira	22	35.85	11,716
Murata Bros.	19	35.84	11,648
Bettencourt Brothers	24	35.69	10,407
W. Theodore Pierson	22	35.67	11,664
James & Manuel Luis	72	35.52	11,231
Barry James	9	35.43	10,431
Manuel Fialho	52	35.36	10,269
A. & R. Lagorio	24	35.36	10,438
Bogetti Brothers	54	35.35	9,495
David Vana	28	35.34	9,514
John Celle	23	35.27	11,054
Merlin Miller	27	35.06	11,605
Pelucca & Wright	20	34.68	11,514
Double "L" Farms	31	34.62	10,005
Vincent Kovacevich	23	34.51	10,105
*San Julian Bros. & Zabalza	65	34.44	9,898
Kay-Dix Ranch Co.	28	34.32	10,426
Barry James	41	34.30	10,180
Joseph Widmer	53	34.30	9,878
Lovegreen & Wilson	24	34.24	10,156
Albert Fonseca	30	34.22	9,787
Bogetti Brothers	88	34.17	10,388
S. A. Nogare	49	33.95	10,029
Paolinelli Brothers	26	33.86	10,483
Craven Brothers	86	33.84	10,321
Laura J. Ratto	24	33.76	9,959
Dixon & Ferreira	54	33.73	10,099
Nishida Brothers	18	33.69	9,433
*Francis E. Hammer	2	33.66	9,714
George K. Ishizuka	24	33.59	10,386
H. E. Nagata	5	33.58	10,511
K. Sasaki	19	33.58	10,739
James & Manuel Luis	24	33.56	10,102
Jack Kimoto	25	33.53	10,461
Robert Giannecchini	27	33.48	9,990
John Narducci	26	33.42	9,946
Pinheiro Brothers	24	33.25	9,097
John L. Lewallen & Son	49	33.18	9,290
Paul T. Ito	22	33.10	9,453
Pastorino Brothers	30	33.06	10,427
Lovegreen & Wilson	48	33.00	8,818
Paul T. Ito	22	32.97	9,687
Paul T. Ito	9	32.80	9,991
Martinelli Brothers	42	32.79	10,532
Lester Rodgers	34	32.79	10,112
Molatore Brothers	16	37.64	8,180
*C. T. & T. Co.	51	32.62	8,964
John D. Cox	24	32.60	9,741
Sousa Brothers	138	32.58	10,028
*Joe Sabbatini	15	32.48	8,763
James W. Hatch	21	32.31	8,750
Bob Belluomini	5	32.26	9,949
*Enos & Woodward	40	32.23	9,140
John Bava	17	32.21	10,275
Joe Lopes, Jr.	35	32.13	9,639
Nobuo Sakamoto	62	32.11	9,749
Giovacchini & Ormonde	33	32.10	10,709
Joe Sabbatini	22	32.03	10,083
George Holck	17	32.00	8,627
Solari Farms	45	31.94	8,560
S. A. Nogare	24	31.87	10,262
Edward Giovannoni	36	31.86	8,908
F. L. Williams	16	31.79	9,098
M. E. & Frank Silva & Co.	100	31.72	9,243
Cox & Perez	24	31.70	7,316
Geo. F. & Charles O. Hansen	23	31.65	9,134
Belluomini & Petrini	25	31.63	9,755
Dean A. Pearce	43	31.61	9,154
George B. Lagorio	156	31.56	9,285
Pellucca & Wright	109	31.49	7,980
Louis W. Pelucca	26	31.45	9,624
J. W. Mahon & Sons	28	31.41	9,806
Louie Quilici	18	31.40	8,779
Norman & Westing	83	31.39	10,321
Mario A. Podesta	56	31.39	9,492
Ed Thoming	90	31.36	8,699
Lester Rodgers	28	31.35	10,396
Richard Alcock	19	31.35	10,615
Wm. F. Garden	17	31.26	10,566
Warren W. Royce	131	31.23	10,037
Gerald R. Ulm	25	31.17	10,573
Elmer Ladd	31	31.15	10,248
Brent D. Hass	35	31.14	8,557
Takemori Brothers	23	31.05	9,358
John J. Armanino	4	31.03	9,309
Guido Biagi	18	30.95	8,524
Mitsuo Kagehira	22	30.94	10,105
Takemori Brothers	48	30.91	9,335
Wm. H. Fisk, Jr.	63	30.85	9,162
Joe Escobar, Sr.	15	30.83	8,867
E. Dondero	23	30.76	8,693
B. Del Carlo & Co.	43	30.73	9,428
Larry Gerhart	38	30.73	9,047
J. Howard Porter	32	30.70	8,332
Grant & Wilson	56	30.65	9,330
Tony Castanho	20	30.63	9,624
E. S. Guler	52	30.59	9,654
Paul Bettencourt	29	30.56	10,115
John Kautz	24	30.55	9,599
Art Renfro & Son	40	30.53	8,909
Joe Garsino	69	30.51	9,574
Tom Sanchez	49	30.48	9,754
Double Jay Company	21	30.44	9,102
Albert L. Bevis	117	30.42	9,016
Roger L. Remonda	25	30.41	9,488
R. E. Thorsen	74	30.37	9,858
Seven Standard Ranch	181	30.35	7,351
Melvin Baumbach	67	30.32	8,702
John D. Chiappe	22	30.29	9,111
Dompe Brothers, Inc.	33	30.25	8,452
Lloyd Shimer	35	30.12	8,699
Manuel Amaral, Jr.	31	30.06	9,457
Craven & Huber	30	30.02	7,763

25 TO 30 TONS PER ACRE

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Frick Brothers	180	29.84	8,033
Giovacchini & Ormonde	67	29.75	9,877
Bogetti Brothers	136	29.73	8,479
Newhall Land & Farming Co.	81	29.70	8,809
Albert Lerno	19	29.68	8,049
Joe G. Fanucchi	37	29.65	9,197
*Lester Rodgers	25	29.64	8,596
Arthur A. Sakamoto	33	29.61	8,143
Mike Pierini	28	29.60	7,880
Triple "J" Farms, Inc.	80	29.59	7,705
Francis E. Hammer	26	29.57	7,948
Lum Bunn & Sons	82	29.57	8,457
*Harry M. Hansen	4	29.54	8,815
The Herzog Company, Inc.	129	29.53	7,961

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*1958 Late Planting.

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Triple "J" Farms, Inc.	142	29.45	7,987
Wm. F. Garden	5	29.45	9,141
Roland F. Oliveira	22	29.39	8,535
Grant & Wilson	60	29.38	8,608
Ernest Machado	25	29.34	8,831
Des Jardins Brothers	66	29.32	9,511
Henry H. Arata	22	29.29	9,109
M. Bargagliotti & Son	28	29.29	8,723
Martin B. Locke	19	29.28	7,765
Louis Augustine	26	29.27	8,313
Edward Giovannoni	47	29.24	8,749
Lyel Thomas	157	29.18	8,573
*Manuel J. Gonsalves	103	29.14	8,095
Enrico Pizzi, Jr.	2	29.12	8,532
George T. Muddiman	53	29.07	8,471
Norman & Westing	97	29.04	9,217
Joseph C. Sanchez	96	29.00	8,259
Locke Ranch	33	28.98	8,682
Lino Bozzano	28	28.94	8,954
Donald Fink	41	28.94	8,364
Nobuo Sakamoto	49	28.93	8,505
Charles Utterback	21	28.90	8,092
Vito Di Leo	16	28.88	8,110
Wolfsen Land & Cattle Co.	11	28.81	8,678
W. E. McDonald & Son	83	28.79	9,103
C. T. & T. Co.	17	28.75	8,533
Pucci Brothers, Inc.	103	28.70	8,059
Sakakura Farms	49	28.67	9,094
John L. Miller	31	28.66	8,862
Joseph C. Sanchez	96	28.64	9,457
George Tomura	25	28.63	9,471
Dixon & Ferreira	147	28.60	8,105
W. F. Pierson	26	28.54	9,624
Beltran Brothers	24	28.51	8,296
Joe E. Green, Jr.	33	28.50	8,647
Joe Valenti	96	28.35	9,446
Fredlo Farms	19	28.28	6,199
Harry H. Heller Company	106	28.26	8,721
John Baragno	77	28.23	7,210
J. & R. Bogetti	37	28.21	8,660
*Herman Ohm	46	28.18	8,989
George Matsuoka	25	28.15	9,487
Pastorino Brothers	66	28.14	9,016
Pryor Farms	146	28.13	9,086
N. L. Ritchey	101	28.12	8,070
Locke Ranch	85	28.10	6,986
Pastorino Brothers	35	27.97	9,225
Pacific Fruit Exchange	141	27.92	7,879
West Coast Grape Farms	47	27.91	8,239
*George Maria	60	27.89	6,766
Allena D. Mealer	23	27.87	7,965
H. A. Saner	23	27.68	8,110
Wolfsen Brothers	57	27.64	7,883
A. J. Cardoza & Son	50	27.62	8,783
Merrill F. West	54	27.61	8,482
*Fred Sneed	40	27.60	8,192
H. N. Crecelius	48	27.59	8,007
Ben T. Harano	33	27.59	7,869
Shafter & Loudon	34	27.57	7,692
S. A. Camp Farms	148	27.56	7,728
Gammon Brothers	26	27.56	7,452
J. & R. Bogetti	100	27.55	7,791
Caminata & Podesta Co.	57	27.50	7,849
Winston W Carmean	87	27.48	8,299
Chester M. Locke	10	27.46	7,123
George Biagi	14	27.46	6,947
Manuel L. Costa	27	27.46	9,227
Joe G. Banducci	50	27.39	6,968
Tony A. Sanchez	89	27.39	7,987
Groefsema Brothers	153	27.34	8,541
G. Caffese & Sons	12	27.31	8,155
Steve Efseaff	20	27.24	6,919
Morey Egusa	20	27.22	8,934
*M. Bargagliotti & Son	13	27.17	7,950
L. E. & Roy Altamirano	17	27.16	7,876
Louie Quilici	27	27.15	7,835
Palm Farms, Inc.	29	27.10	7,550
Salisbury & Johnson	32	27.08	7,642
*David Giordano, Jr.	40	27.02	8,225
Wolfsen Land & Cattle Co.	59	27.01	8,130
S. A. Camp Farms	38	27.01	7,730
*Norman Vogt	125	26.96	7,533
*Manuel Neves, Jr.	38	26.95	8,010
Edward R. Lewis	118	26.93	9,355
George Clever	22	26.88	8,295
Anthony Alves	21	26.84	8,299
Erreca Farms	22	26.84	8,669
Norman Vogt	23	26.81	8,370
R. E. Shick	123	26.73	7,677
Jon Brandstad	1	26.65	7,579
Richard Brandstad	1	26.60	8,049
J. H. Cardwell	48	26.59	7,413
Kaiser & Lindeman	120	26.57	8,731
Warren W. Royce	17	26.55	7,811
Newhall Land & Farming Co.	198	26.54	8,334
*Locke Ranch	10	26.52	7,187
Gerritt Velthoen	9	26.49	7,820
*Winston W. Carmean	28	26.46	7,636
Dwayne Petz	95	26.46	8,250
Louis Giovannoni, Jr.	48	26.45	8,295
Martin S. Grier	24	26.45	7,776
M. D. Escano & Son	35	26.44	7,742
Cerro Brothers	40	26.43	6,512
Tony A. Sanchez	131	26.42	8,005
H. M. & H. C. Fisk	84	26.34	8,539
*John J. Armanino	49	26.30	7,774
Tanaka Farms	168	26.27	8,343
Lind Brothers	19	26.26	8,083
Newhall Land & Farming Co.	87	26.26	7,206
*Christiana & Skaggs	63	26.19	7,815
C. R. Wilkins	37	26.18	8,964
Gerald C. Johnson & Son	34	26.18	8,027
C. Provost	25	26.16	6,085
George B. Lagorio	74	26.09	8,432
Marion Sanchez	206	26.04	7,906
Frank Giannecchini	25	26.00	7,488
Motoike & Yamauchi	37	25.96	7,347
J. Sanchez & Sons	119	25.96	7,855
Sullivan & Gragnani, Inc.	39	25.89	7,016
John Borba, Jr.	28	25.89	7,720
*Jack L. Cardwell	3	25.86	7,039
Newhall Land & Farming Co.	184	25.86	7,996
*Donald Fink	13	25.83	8,152
Brown Brothers	192	25.79	7,247
Anna Garsino	10	25.70	8,353
Takemori Brothers	62	25.70	7,736
Lester Rodgers	36	25.69	8,401
Joseph Sanchez	102	25.69	7,692
C. & R. Ferdun	57	25.67	8,240
*Kimmel & Eslinger	39	25.61	8,042
San Julian Bros. & Zabalza	65	25.60	7,112
Jack Hengst, Jr.	1	25.58	7,086
Sam & D. M. Biancucci	24	25.57	7,303
Howard Hay Co.	58	25.57	7,257
Stuart A. Lewis	36	25.54	8,387
Banducci Farming Co., Inc.	144	25.50	6,115
Hanson & Barkley	135	25.41	6,851
Lester Gustafson	18	25.40	6,792
Enos & Woodward	53	25.29	8,133
Shizue Mizuno & Sons	23	25.24	8,168
John J. Armanino	66	25.19	6,922
Poso Dairy Farms	5	25.17	7,375
Heckert & Warford	126	25.16	7,040
Richard C. Medeiros	32	25.14	8,115
H. N. Crecelius	74	25.06	8,190
*Nishida Brothers	83	25.05	7,380
Haynes F. McClellan, Jr.	19	25.03	6,583
Joe Sabbatini	25	25.02	6,901
*Edward R. Lewis	13	25.01	6,973
W. J. Greenlee & Son	29	25.01	7,628
Joe Maciel & Sons	80	25.01	6,828

JOHN J. VANETTI 61
Top Grower in District 3

DISTRICT 3—WOODLAND

OVER 40 TONS PER ACRE

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
John J. Vanetti	72	48.60	14,444
Dela Torres Brothers	60	41.76	11,517
Nishikawa Brothers	48	41.42	12,004
Henry Rehrman	109	41.39	12,947
Robert C. Gill	110	40.25	11,769
30 TO 40 TONS PER ACRE			
Chew Brothers	32	38.86	11,953
C. E. Frazier	12	38.60	11,773
Fred H. Rehrman	114	38.57	11,664
O. O. Orrick	60	38.47	11,941
K. L. Morris	87	38.31	10,911
James I. Tadlock	47	38.15	12,109
Mrs. A. J. Greer & Sam Clark	46	38.04	10,393
Garth L. Gill	75	37.98	11,022
Arnold Collier	80	37.88	11,864
Martin Brothers	51	37.82	11,535
Hamatani Bros. Farms	93	37.43	11,581
John J. Vanetti	63	36.91	11,073
M. Romani	123	36.87	11,149
Edgar Everett	55	36.84	12,341
John J. Vanetti	18	36.74	11,360
A. E. Holly	48	36.71	10,940
Shigaki Brothers	149	36.44	11,063
Elwood M. Olson	99	36.13	10,377
Fred S. Tadlock	138	35.97	10,510
Guido Romani	67	35.73	11,012
William Erdman, Jr.	55	35.72	10,073
Mary & Manuel Bastiao	35	35.68	12,410
J. H. Braden	36	35.63	10,083
F. & F. Beet Company	141	35.61	9,999
Richard E. Evensen	20	35.45	10,890
Otto Strehle	23	35.33	10,479
Eugene G. Cain	20	35.30	10,223
Hanks & Meneley	64	35.28	10,005
K. Shimizu	43	35.26	9,901
Nishikawa Brothers	35	35.22	9,502
C. M. Ordonez	7	35.20	11,384
George M. Struve & Son	100	35.06	9,480
Wallace L. Turner	44	34.95	10,632
K. Shimizu	18	34.95	9,835
Heidrick Brothers	95	34.78	10,392
Alfred Alvernaz	45	34.71	9,865
Heidrick Brothers	67	34.56	10,465
Thorley Brothers	68	34.54	10,639
Theodore Strehle	27	34.39	10,585
Samborsky & Bender	32	34.35	10,477
Nishikawa Brothers	41	34.32	9,596
G. A. Hanks	29	34.28	10,243
K. L. Morris	19	34.18	10,849
Floyd E. Warner	28	34.15	10,798
Emmett Heidrick	44	34.12	10,154
Heidrick Brothers	46	34.11	9,899
Calvin M. Lemen	22	34.07	11,666

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*1958 Late Planting.

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Vernon A. Mast & Sons	23	34.06	11,110
Bruce Beeman	199	33.93	10,227
Van Smith	153	33.92	10,617
Grimmer & Arcand	62	33.82	11,621
*Willis E. Hansen	28	33.80	7,821
E. L. Wallace	26	33.63	11,024
Wilson M. Lovvorn	81	33.60	10,705
George E. Wallace	25	33.56	9,316
Tsuji & Inouye	39	33.51	9,322
Tom D. Tolson	22	33.51	8,786
George M. Struve & Son	75	33.51	10,046
R. J. Weyand & Son	35	33.44	10,781
*Herbert & Paul High	7	33.39	9,723
George M. Struve & Son	27	33.31	9,793
J. Dudey Stephens & Son	12	33.26	10,504
Arthur N. Oji	50	33.23	10,275
*Leo Meneley	30	33.21	9,478
Robert C. Schulze	105	33.05	10,153
Alrob Farms	152	33.04	9,681
Carl H. Becker	203	32.98	9,307
Dan G. Best	149	32.97	9,621
Dela Torres Brothers	33	32.96	9,697
Heidrick Brothers	135	32.94	9,381
Richard Moore	115	32.91	10,097
Roy Hatanaka	32	32.87	9,710
Manuel Escano	29	32.76	11,125
*J. M. Campbell	58	32.68	10,229
Thomas R. Mabalot	30	32.62	9,995
Joe Gnos & Son	32	32.62	9,890
C. C. Whealey	78	32.59	11,413
Oji Brothers	24	32.59	9,581
George M. Struve & Son	127	32.58	10,634
O. O. Orrick	58	32.57	10,488
Rudy Howald	119	32.54	9,567
Albert E. Tandy	59	32.52	9,925
Robert C. Schulze	96	32.51	10,605
Oji Brothers	38	32.49	10,553
Oji Brothers, Uno & Terao	22	32.46	10,037
Bruce Beeman	26	32.42	9,421
Darrell T. Day	36	32.37	9,892
Glenn E. Morris	79	32.20	9,737
Ernest L. Purcifull, Jr.	24	32.06	8,207
Carl Wiegand	29	32.03	10,442
Catherine Strehle & Sons	40	31.99	9,955
A. C. Macias & Son	23	31.98	8,609
H. J. Erickson & Son	82	31.90	9,883
J. R. Phillips	35	31.90	9,391
M. Barandas	28	31.89	10,351
Donald H. Wilson	163	31.65	10,185
Arnold Collier	75	31.65	9,919
M. G. Machado	51	31.58	10,459
Harley & Harvey Rominger	40	31.57	10,178
Joseph A. Kergel	26	31.55	9,692
Orth Brothers	75	31.52	9,992
John M. Lear	84	31.30	10,054
*Robert Leslie Button	25	31.30	7,938
Pete Konitzer	123	31.28	9,115
California Packing Corp.	131	31.28	8,890
Frank Alvernaz	85	31.24	9,547
George L. Barry	44	31.07	10,713
Edwin M. Ullrich	66	31.05	9,346
George M. Struve & Son	307	31.04	9,498
Harlan & Dumars	77	30.94	10,142
Joe Yeung	50	30.90	9,425
Meek & Le Maitre	93	30.90	9,023
Wetzel Brothers	72	30.88	8,325
Jonathon Edgar Everett	5	30.83	9,280
Anderson Brothers	128	30.81	9,681
C. R. Oclaray	40	30.73	9,360
Frates & Shimada	78	30.71	9,360
Hanks & Meneley	14	30.64	9,014
Harlan & Dumars	144	30.62	8,586
T. Elsen Glide	68	30.59	9,361
The Regents of Univ. of Calif.	2	30.54	8,508
James N. Fulmor	142	30.44	10,155
E. A. & Glenn Watkins	52	30.40	10,172
*Howard Brothers	56	30.38	8,701
Liberty Farms Company	28	30.35	9,044
Rosalind G. Criste	36	30.31	8,826
Fred Bender	27	30.30	9,938
Joseph W. Machado	47	30.26	9,145
John J. Vanetti	35	30.23	9,323
Oji Brothers, Uno & Terao	80	30.17	9,274
Mas Oji	89	30.14	9,229
Ton G. Lum	24	30.11	9,533

25 TO 30 TONS PER ACRE

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Heidrick Brothers	28	29.98	9,726
A. J. Rodgers, Jr.	9	29.98	8,610
Kilkenny Brothers	95	29.93	9,877
Vern Ornbaun	25	29.90	8,145
Chew Brothers	138	29.88	10,117
Wilson M. Lovvorn	69	29.84	9,232
D. A. Trimble	21	29.82	8,678
Damsen Brothers	32	29.75	9,734
M. J. Wolfe	20	29.75	9,645
Herbert & Paul High	19	29.73	8,711
M. B. Avilla	93	29.72	9,837
John M. Dinsdale	61	29.68	8.370
*Heidrick Brothers	108	29.66	7,563
Robert Leslie Button	72	29.64	9,224
C. Warren Morris	178	29.57	8,073
Pete Konitzer	144	29.54	8,407
*Stanley Rooney	20	29.47	8,670
Wetzel Brothers	28	29.44	7,802
Frank Sakurada	27	29.35	7,784
A. K. Kozono	25	29.34	9,888
*Albert E. Tandy	30	29.25	8,705
Louis Parella & Sons	43	29.24	10.076
Leroy Traynham	26	29.24	10,018
Michael J. Merkley	24	29.24	8.719
M. B. Avilla	60	29.22	8,965
Glenn E. Morris	70	29.14	8,882
Ellard J. Vierra	11	29.09	8,663
Dela Torres Brothers	20	29.05	9,232
Wetzel Brothers	37	29.03	8,558
Wm. E. Duncan	43	29.02	9.397
George T. Dakuzaku	24	29.00	7.557
Louis Gimenez	130	28.88	9,709
E. L. Wallace	31	28.86	9,380
Hahn & Peters	42	28.85	8.759
William R. Lider	155	28.84	9.102
Ralph Moss	24	28.83	9.289
Floyd E. Warner	72	28.74	9.455
Rosalind G. Criste	37	28.72	9,317
Ojima Brothers	35	28.66	7,807
J. L. Azevedo	36	28.62	8,489
C. G. & T. H. Roth	21	28.62	8,426
*Fritz Erdman	88	28.59	7,594
Erle E. Santens	127	28.57	8.245
Lloyd M. Eveland	154	28.52	8,961
Buchignani & Hughes	80	28.50	9.274
*R. E. & H. R. Plank	7	28.50	7,912
Meek. Meek & Le Maitre	65	28.49	7.630
J. V. Little	21	28.48	7.661
Catherine Strehle & Sons	88	28.43	8.040
Arlan Moore	43	28.35	8,176
Jack Perry	8	28.31	8,918
Dixon Dryer Company	38	28.23	8,853
Stanley Rooney	25	28.23	8,509
John J. Vanetti	109	28.22	9,375
Thorley Brothers	27	28.15	8.867
William R. Lider	48	28.13	9.058
E. H. Kunze & Son	132	28.12	9.257
Wilson M. Lovvorn	36	28.12	9,105
Boodjah Singh	65	28.03	8.644
Toyokichi Morita	14	28.02	8.826
Arnold Collier	35	27.99	9,175
Schneider, Fricke & Schneider	49	27.88	7,879
Chase Low	19	27.87	8,673
Wilson M. Lovvorn	36	27.87	8,004
*W. R. Peterson & Son	17	27.85	8,427
Martin Brothers	60	27.83	7,781
Sagara Brothers	36	27.79	9,365
C. M. Ordonez	77	27.76	9,233
Rominger Brothers	25	27.73	9,644
Frank Dyer	262	27.71	7,581
George D. Stephens	31	27.69	8,850
C. A. Fisk	53	27.67	8,080
Ted Mata, Jr.	34	27.63	9,549
Malcolm Farms	118	27.62	9,181
Edgar Everett	35	27.60	8,584
L. L. Godfrey	45	27.53	8,083
John W. Brazil	23	27.51	8,297
Durst Brothers	72	27.46	8,381
Tsutsui Brothers	19	27.46	8,057
Mary & Manuel Bastiao	13	27.45	8,757
Fritz Erdman	261	27.45	8,444
Alice E. & Ernest J. Rogers	28	27.40	8,182
*Meek & Le Maitre	81	27.38	8,192
H. E. & Donald Helms	26	27.36	9,439
Michael Enos	37	27.31	9,214
Ernest Goetze	8	27.31	8,411
John E. Montgomery	22	27.29	7,805
E. C. Watson	55	27.25	8,965
Chuck Sakurada	8	27.23	9,231
Keith B. Nelson	120	27.17	9,200
M. Anchita	74	27.10	8,813
Fred C. Heidrick, Jr.	21	27.10	8,721
Meek & Le Maitre	150	27.05	8,169
Herota Brothers	51	27.05	7,845
Wallace Brothers	87	27.03	7,968
*Emmett Heidrick	71	26.95	7,939
California Packing Corp.	100	26.95	7,751
Bernie Gorman, Jr.	25	26.95	7,519
*Willis E. Hansen	22	26.83	7,228
Frederick H. Grimmer	23	26.82	7,821
Jim Palmer	37	26.80	7,949
Almon Sutliff	28	26.70	8,320
Manuel Antone	4	26.68	8,559
Meek & Le Maitre	112	26.67	8,524
Robert Leslie Button	94	26.67	8,124
Dixon Dryer Company	29	26.63	8,894
Joe Gwerder	17	26.61	7,951
John E. Jackson	18	26.52	8,704
K. & M. Kimura	25	26.52	8,110
Arnold Collier	105	26.51	8,547
Heidrick Brothers	79	26.42	7,588
Chew Brothers	124	26.37	7,906
George Y. Abe	52	26.35	8,395
Wilson M. Lovvorn	72	26.33	8,289
California Packing Corp.	70	26.26	8,682
I. T. Eveland	72	26.26	8,235
C. G. & T. H. Roth	48	26.26	8,214
Delbert J. Silva	33	26.20	8,279
Tim Yoshimiya	33	26.19	8,700
Richard Moore	138	26.19	7,784
Willis E. Hansen	26	26.18	8,629
William C. Maupin	18	26.18	7,891
*Heidrick Brothers	46	26.18	7,021
Lyman P. Phillips	37	26.15	8,776
David James Wilson	28	26.12	7,841
E. N. & W. F. Winters	75	26.11	8,204
Ralph W. Pollock	68	26.09	7,785
*Bruce Beeman	61	26.09	7,316
Chuck Sakurada	13	26.06	7,667
Porterfield & Stephens	141	26.02	8,665
Burt M. Kloster	30	25.92	7,164
R. M. Farnsworth	176	25.88	7,743
H. M. Wilber & Son	98	25.87	7,626
Akira Mizoguchi	24	25.87	7,528
*Meek & Le Maitre	98	25.87	7,440
Lawrence P. Hanks	22	25.86	7,732
C. Bruce Mace	278	25.84	7,308
Rudy Howald	96	25.84	6,941
Frank Silva	26	25.83	8,074
Heidrick Brothers	321	25.80	7,848
Tash & Gomes	34	25.78	8,626

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*1958 Late Planting.

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Kataoka Brothers	27	25.78	8,466
I. T. Eveland	55	25.75	9,167
Manuel Lewis	46	25.75	8,528
Neat Sawyer	20	25.70	7,803
Heidrick Brothers	84	25.64	7,825
Frank E. King	58	25.64	6,836
Taxara & Machado	74	25.63	9,053
M. & T. Farms	32	25.55	8,324
K. N. Matlick	24	25.55	6,990
I. T. Eveland	55	25.53	7,863
*F. & F. Beet Company	100	25.52	5,783
C. G. & T. H. Roth	79	25.51	7,525
*C. G. & T. H. Roth	24	25.51	7,362
James M. Campbell	35	25.48	8,230
*R. E. Hoagland	40	25.36	7,055
Noboru Hitomi	68	25.31	8,327
E. L. Comontofski	12	25.31	8,044
Evergreen Farms	22	25.27	8,546
Timothy & Blickle	27	25.24	7,299
Roy Holmes	58	25.22	7,859
Howard Beeman	52	25.17	7,969
Clark Davis	22	25.11	8,000
Richard Moore	36	25.09	7,422
Leroy L. Leonard	159	25.03	7,134

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*1958 Late Planting.

Notes from Our Field Men

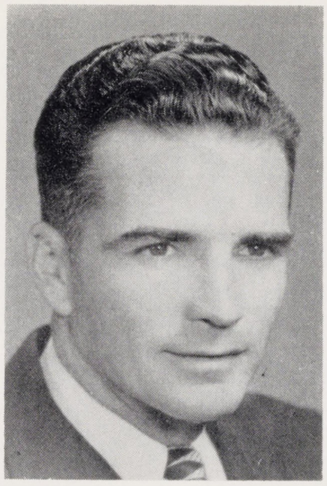
62

CHARLES CARLSON,
Woodland

While working in the Swingle area last fall, I observed two Gemco harvesters where soil conditions were too dry. These machines were having nothing but trouble keeping on the row and consequently, were leaving a lot of broken and whole beets in the field. Also, the big clods were going into the loads and were causing the growers a high percentage of tare.

I asked these growers why they let the soil get so dry and the answer was "to get a higher sugar content". If this were true (and I question the theory of getting higher sugar by letting the soil become bone dry) the number of beets left in the field, the decreased tonnage from lack of moisture, and dirt hauled to the receiving station will more than offset any increase in sugar content.

Conditioning the soil for harvest and striving for better moisture conditions at harvest, especially where Gemco, McCormick or Farmhand harvesters are used, should be an important consideration. This is true both from the grower's standpoint as well as the processor's, because of eliminating high tare from clods, and loss of beets in the field. With our system of harvest quotas, the coordination of irrigation with harvest plans can be a very important factor in crop production and harvest economy.



63

W. J. HURLEY,
Los Banos

Norman Vogt, a grower in the Dos Palos area, devised a new method of eliminating additional trash and dirt from falling into the trucks from the Gemco diggers.

Norman has put a metal plate under the elevator chain, extending from the top downward three feet. Any clods or fine dirt falling through the elevator chain are thus carried away from the truck.

Two other growers are following the same plan and are having excellent results.

I am encouraging all Gemco and Farmhand operators to follow the same plan.

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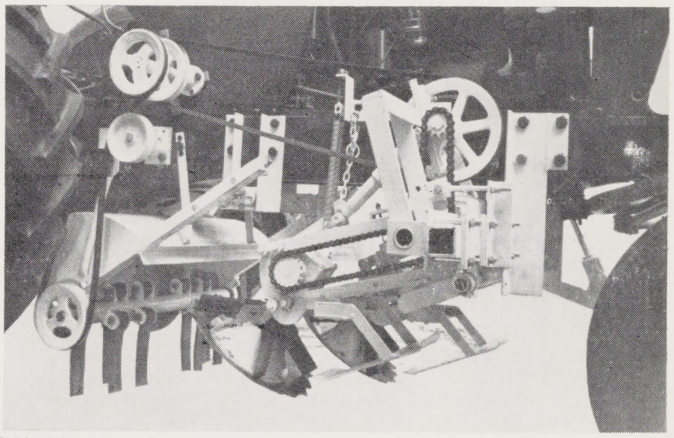
JOE HULL, Manteca

One commercial beet harvesting contractor, operating in the Tracy area, has come up with some outstanding results on beet deliveries. The first three loads we checked averaged 97.4% clean beets.

He is using a re-worked Gemco topper followed by a roto beater and a Gemco digger. The soil is heavy clay and hard enough to give trouble in lifting for an adjacent hand crew.

The clean beet percentage is approximately two percent higher than that of the hand crew, and in my opinion, the difference lies in the better topping job done by the Gemco topper.

EDITOR'S NOTE—This arrangement has genuine merit, as witness the fact that the 1960 Gemco topper includes a rotary-flail beater. (below)



General Machine Co.

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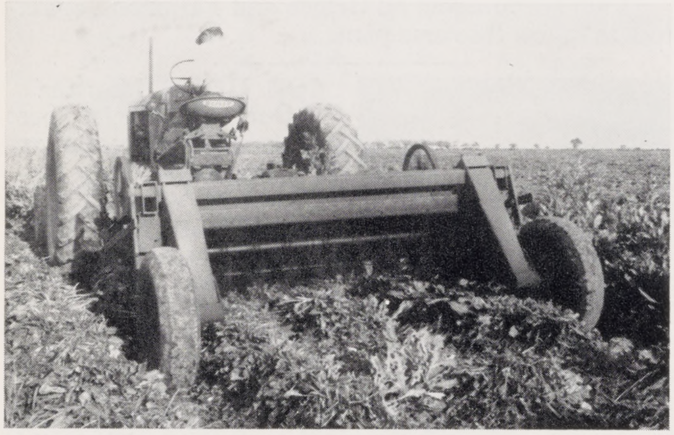
DON'T BLAME THE HARVESTER

(Continued from Page 31)

A favorite late-season alibi for bad topping is "The crowns of some beets are so high that the flails won't even touch the low beets". There's a cure for that ailment—a Rotocycle or forage harvester (Lundell, John Deere, etc.) to pretop ahead of the beater, (or of the Marbeet harvester, 1 or 2 row).

Attention is called to the successful harvesting contractors—the men who stay in business by selling a good job of harvesting, and not excuses. The photos below were taken during Spring harvest near Woodland, when the beets had very high crowns—some starting to bolt. The contractor is C. E. Frazier, and the steps he takes to insure a good topping job are pictured here to prove that clean, well topped beets can be delivered from fields with severe harvest problems.



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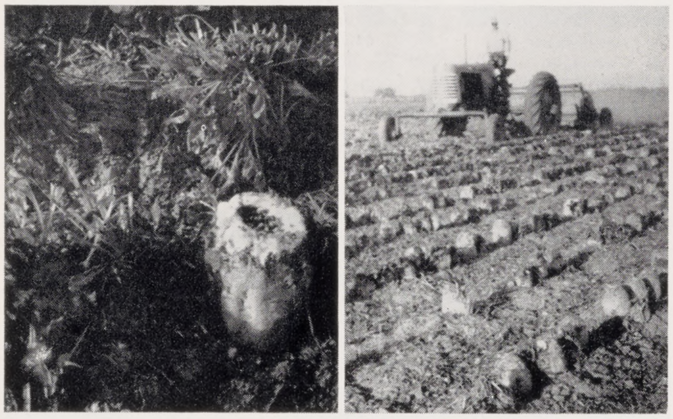
STEP 1. Tops are levelled off with a forage harvester (blower stack removed). Extra high beets are scalped (below, left).



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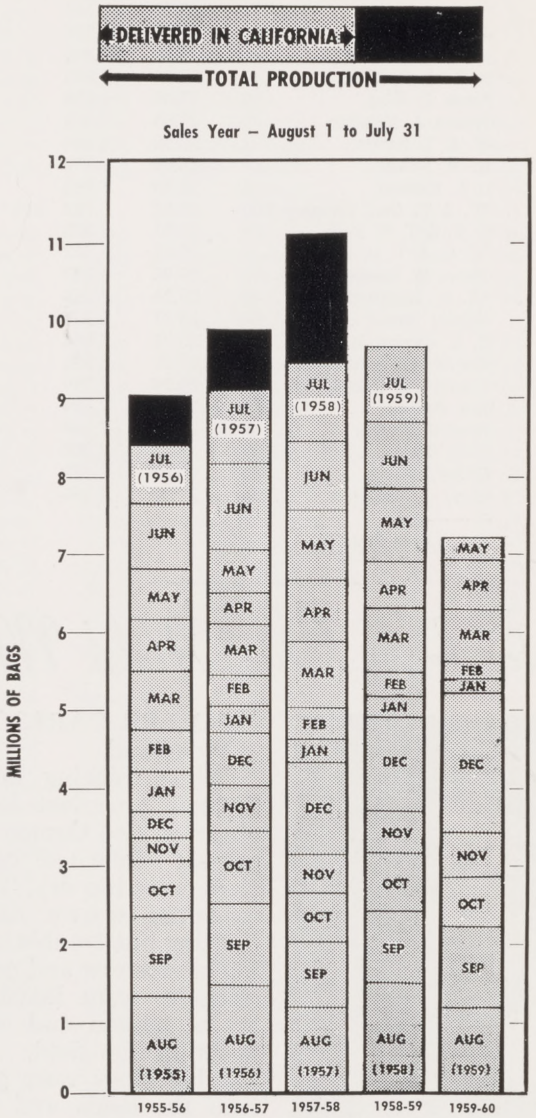
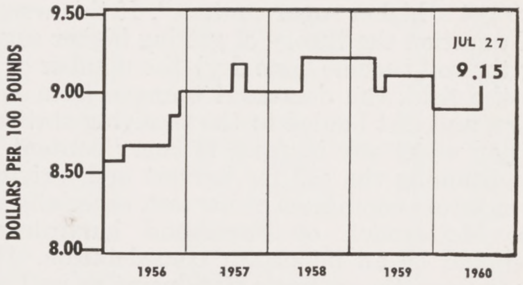
STEP 2. The field is beaten TWICE, once in each direction, with a rubber flail beater. The extra high beets are undamaged, while the lower beets are well topped.

PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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The SPRECKELS SUGAR BEET BULLETIN is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers.
Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.

AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY
WOODLAND, CALIFORNIA

OCT 24 '60

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VOL. 24 SEPTEMBER-OCTOBER, 1960 NO. 5

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AFTER HARVEST - - WHAT?

Harvest marks the end of one crop—but it can be the beginning of the next.

LAND MANAGEMENT
CROP PLANNING
ROTATION

are subjects to be acted on as harvest nears completion. See pages 38 and 39.

LAND MANAGEMENT—THE BEST CROP INSURANCE

By J. NORMAN DAWE, *Field Superintendent*
Spreckels Sugar Company

WHILE MANY legitimate crop insurance policies are in effect every year, a policy which would guarantee a bumper crop every year is just beyond the realm of economic feasibility. However, there is one type of crop insurance which is financially sound, and is within the reach of all farmers. In addition it pays dividends consistently. This is good, far-seeing management of the land. Many beet growers are at present busy with harvest, but that is exactly the time to be concerned with preparing the land for succeeding crops.

An attempt to establish a cut and dried set of rules for the optimum land preparations for all the fields on a particular farm would be unrealistic. However, there are several very important factors involved in this "First Move" on every crop which can be spelled out, these do apply to all fields on all farms. As to the importance of each factor, they all pretty much carry equal weight because they complement each other. By the same token overlooking any one of them will result in a general detrimental effect.

At the risk of being accused of "preaching," I would like to set down some of the basic steps of land preparation program.

KNOW YOUR LAND

First, know your land. Not just where it is, or what series or type of soil it is but what really are the year-round conditions on it. What is the crop history, the irrigation and drainage record, the fertilizer history? To keep the entire record by memory is at best only a close guess as to what operations did pay off and how much fertilizer at a certain stage of growth gave a good response. Price tags should not be omitted in the record book. A good program five years ago could very well be uneconomical today.

The opposite extreme is the grower who keeps a valid record of operations on his farm, but has such a cumbersome set of books that only a "Philadelphia lawyer" could analyze them for reference purposes. The record book should deal with details, but needs to be simple in organization. Also the notes need to be complete, from any unusual severe temperatures and weather conditions, down to the final yields and harvest dates. Thus in planning for a coming operation at any time of the year, a quick reference to as many pages as there are years involved would tell you all there is to know about that one piece of land.

TIMING OPERATIONS

Second, the factor of timing of operations is a critical one. In reality, this is the primary function of the farm manager, whether he is responsible to himself or to a company. This factor must be based on either experience or the record book (or preferably both). When hunches or guesswork enter into the decision, the ultimate crop will reflect how wild the guess was. There is an abundance of weather records available at little or no cost to the grower from various state agencies. Consequently, gambling with the weather indicates a sporty, but rather senseless, flaw in managerial ability. Under California weather conditions, the best time to begin working a piece of ground for the next crop is as soon as a tractor can get into the field following the beet harvester. The record book should tell whether that tractor should be pulling a deep plow, a disc, a chisel, or a stalk chopper. Whatever the tool is, advance planning and early initiation of work will pay.

GOVERNMENT REGULATIONS

Third, there is the matter of compliance with government crop regulations. Many hardships are worked upon the farmer of today because the government must delay information on acreage allotments until late in the season. But let us not blame the government for being late in preparation. The ground must be worked whether the next crop is to be cotton, or tomatoes, or barley, or anything else. If it must lie

(Continued on Page 44)

Caterpillar Photo 70

GOOD LAND management means working the ground immediately following harvest. Knowing what the next crop is to be helps to plan a sound land management program—the best crop insurance.

DISEASE IS A FACTOR IN CROP PLANNING

By WILLIAM DUCKWORTH
Field Superintendent,
Spreckels Sugar Company

THE FALL season of the year marks not only the completion of production efforts of the spring and summer just past, but equally important, it is the planning period for the crop year just ahead. It is the time for deciding what crops to plant, when and where to plant them and what fall operations must be completed to gain the greatest production. Many factors must be taken into consideration when developing a farming program; availability of ground, crop rotation, time of harvest and potential disease problems. This latter consideration can be the controlling factor of ground availability for certain crops, for if a grower ignores disease problems, the results may be disasterous.

The sugar beet grower more than any other producer must take into consideration soil-borne disease when consideration is given to various parcels of crop land. Not only can the diseases greatly depress yields, but can, in some instances, affect the amount of conditional payment made under provisions of the sugar act. The major soil borne diseases encountered by a beet producer are the nematodes and root rots.

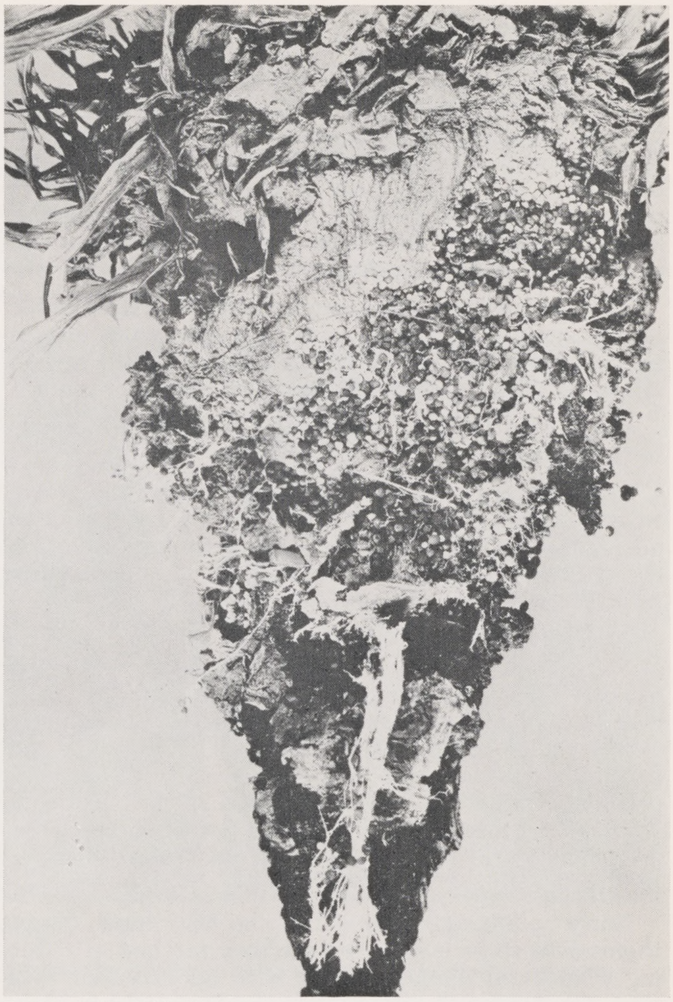
Throughout many areas of the Central Valley of California much of the row crop ground is infested with the fungus *Sclerotium rolfsii.* This fungus, Southern Sclerotium root-rot, is the most severe of all the root-rots and in the hot interior valley is probably the most serious root disease attacking sugar beets. Since there is no known practical means of freeing the soil of the fungus once it became infested, the most that can be accomplished is to reduce the amount of the fungus to a level where susceptible crops can be grown profitably.

Two questions can be logically asked:

1) How can the level of infection be reduced? 2) What farming practices can be employed that will give the greatest success in holding root damage to a minimum? To answer both questions, it is necessary to discuss the conditions under which the development of the fungus is most rapid.

The spread of the disease is greatest in susceptible crops and under optimum soil conditions. Crops such as sugar beets, carrots for seed, potatoes, beans, cotton, tomatoes and onions are susceptible, while alfalfa, asparagus, wheat, barley and corn are non-susceptible or slightly susceptible. Therefore, proper crop rotation is of primary importance in reducing the level of infestation.

As a general rule of the thumb, the same type of rotation that is applicable to nematode fields is satisfactory for fields having a sclerotium history. Dry farmed or non-susceptible crops immediately preceding the beet planting are the preferred rotation. However, this is not always possible as tomatoes alternate extensively with sugar beets. Tomatoes, although susceptible are not, as a rule, severely infected under ordinary cultural conditions in Central California.



Prof. J. B. Kendrick Photo 71

THIS BEET is suffering from Sclerotium rolfsii in its final stage. The numerous "seeds" (sclerotia) resemble mustard seeds—these can carry infection to distant fields if flood water should float them away.

The number of years required to reduce the Southern Sclerotium root rot fungus in the soil to a point where a sugar beet crop can successfully be grown varies so much that only a determination of fungus population will indicate if infected ground should be planted to a susceptible crop.

Overproduction of sugar beets, on certain fields, is probably the major cause for a buildup of the disease in many areas of the state. In areas of potential sclerotium infestations, serious damage can result from not following an adequate rotation. This is especially true if sugar beets are planted two years in succession.

Sclerotium is also known to be most active at high soil temperatures. The most rapid development occurs at soil temperatures between 85 and 90 degrees Fahrenheit, while at temperatures of 70 degrees Fahrenheit and below little infection takes place. It is also known that high soil moisture is necessary for the development of the fungus.

High temperature and high soil moisture occur simultaneously during much of the growing season forming ideal conditions for the spread of the disease. If possible, a reduction in either temperature or moisture would retard the development of the fungus and reduce root damage. In many cases, growers have been able to lower soil moisture by dropping late irrigations and harvesting the crop at an early date. This, of course, is possible only if a satisfactory yield is present at harvest. In most cases, only early plantings have produced an adequate yield by the critical period of late July-early August.

Time of planting has demonstrated a definite effect on the amount of root loss due to a sclerotium infestation. Early plantings, in this instance, should be considered as plantings made from October to March.

Early plantings have reduced the possible root loss in two ways:

1) The early maturity of the crop allows the grower to harvest in July and August during the period of most rapid sclerotium spread. Even though some root rot is present at this time, the lack of soil moisture retards the spread of the fungus.

2) Early plantings also have the advantage of delaying or setting back the time of rapid growth of the fungus. This delaying action occurs because the larger, well developed top growth covers the row and furrow shading and cooling the ground. This shading, undoubtedly, reduces the soil temperature during early periods of high dry temperatures. If the particular year is not unseasonably hot, the period of rapid disease development can be delayed until shortly before harvest.

Early planting and early harvest have shown themselves to be a most satisfactory method of reducing sclerotium damage. Even with an excellent rotation, the danger of serious crop loss is present in many fields with a sclerotium history; therefore, any farming practice that can reduce this danger is desirable. If by proper rotation, adequate fertilizer and good cultural practices, the incidence of sclerotium activity can be delayed until shortly before harvest, the grower will be insured that the tonnage loss will be held to a minimum.

SPRING MECHANIZATION DEMONSTRATED AT SPRECKELS

By AUSTIN ARMER, *Agricultural Engineer*
Spreckels Sugar Company

ON SEPTEMBER 27th, growers for Spreckels Sugar Company attended a demonstration of spring mechanization at Factory I, Spreckels. Spreckels Sugar Company thanks the growers who attended and hopes that they benefited from what they saw.

It is noteworthy that this demonstration was timed far in advance of 1961 spring work, so the growers could give adequate consideration to what they saw and could have plenty of time to anticipate their spring program.

This matter of anticipation is the secret of successful spring mechanization. Some of the lessons which the demonstration taught showed very clearly the fact that improper anticipation of a mechanical thinning program could result in near-failure. Let it be clearly expressed at this time that some of the conditions leading to unsatisfactory mechanical thinning were deliberately introduced in preparing for this demonstration.

For example, the series of plots in which planters were driven at excessive speeds was designed to demonstrate clearly that mechanical thinning could not be successful in a stand of beets full of skips and clumps, such as result from planting at too high a speed.

Another lesson was in connection with the misfortune of planting beets at the bottom of a trench which made it impossible for the thinner knives to reach the beets. The cause for the deep furrows in which the seedlings emerged was primarily the very soft, fluffy nature of the soil in this field when planted dry. But contributing to this condition was the fact that the planters used were of the type which uses the press wheels to drive the planter mechanism. The result was that too much pressure was required on the press wheels in order to keep them rotating. Con-

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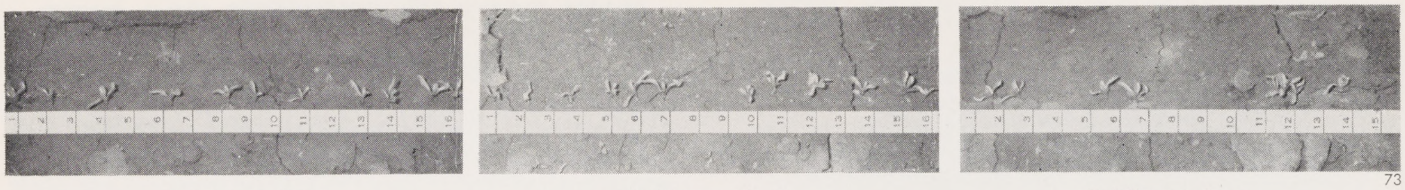
GROWERS CAME from all Spreckels beet-growing area to view the spring mechanization demonstration at Spreckels on September 27, 1960.



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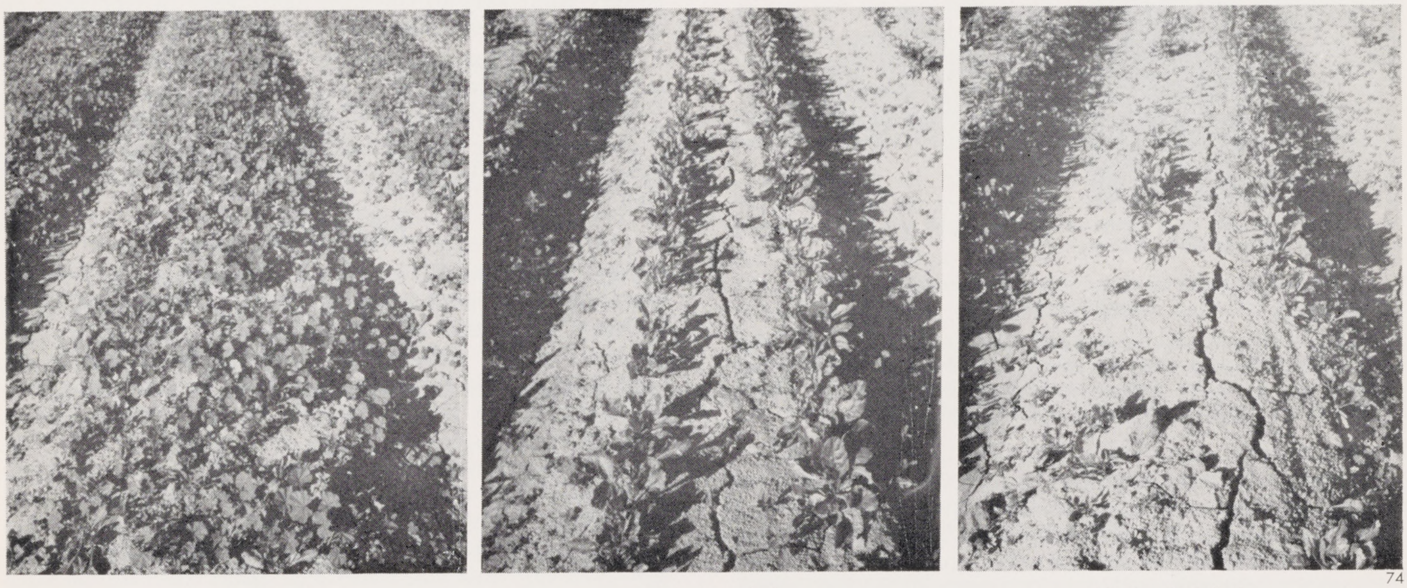
4 Miles per hour
81% Emergence

6 Miles per hour
75% Emergence

7 Miles per hour
50% Emergence

PLANTER SPEED has an important bearing on the stand. These three examples of recently emerged seedlings show how the higher speed make skips and clumps. (Perfect planting and emergence would have yielded 16 plants in each panel above.)



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No Treatment

4 lbs. Endothal

12 lbs. Endothal

IF A LITTLE is good, more is not necessarily better. A reasonable dosage of Endothal was effective; a heavy overdose was injurious to the beets.

THE BLACKWELDER Thinner

THE EVERSMAN Thinner

75

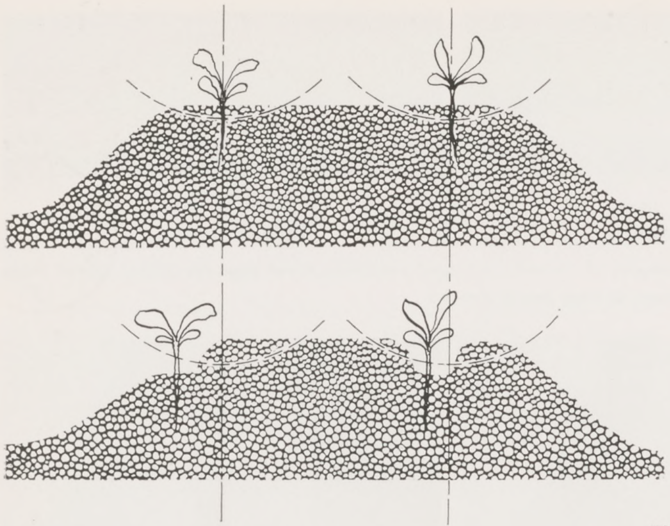
THE SILVER Thinner

sequently, they dug rather deep furrows from which the seedlings emerged.

In contrast, the beds planted with a sled planter having separate traction wheel to drive the planter mechanism gave a nearly flat-top seed bed with seedling in a position ideally suited for subsequent mechanical thinning.

Let it be clearly understood that this comparison was not designed to condemn tool bar-mounted planting units with press wheel drive. On the contrary, it pointed up the need for proper judgment in choosing planting methods suitable to the soil condition. If beets must be planted in soil which is very fluffy and loose, especially on beds, care must be taken that the planter unit turns very freely so that only a minimum of pressure on the press wheel is necessary to maintain rotation.

On the other hand, the virtues of a sled-mounted planter seem to be undeniable. Regardless of the type of planter used in this sled, the resulting job has the very great advantage of absolutely uniform shoulders on the beds, with the beet rows following the beds



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THESE DIAGRAMS were designed to show right and wrong ways to plant beets for mechanical thinning.

ABOVE is a desirable condition; bed flat, seedlings well centered on rows. Thinner knives cut against firm soil.

BELOW is an impossible condition for mechanical thinning, yet all-too common. Seedlings are off-center from rows and emerged in the bottom of deep grooves due to excessive pressure on the planter gage wheels. Thinner knives brush past seedlings, but don't cut them off.

whether they are straight or not (the difficulty of driving a tractor with a set of planters mounted on the rear tool bar is self evident—it is no wonder that the beet rows so planted wander from side to side of the previously formed bed).

All of this experience seems to point to the fact that the sled-mounted planter (which has been in almost exclusive use in the Salinas Valley for at least 30 years) has some very basic reasons for its acceptance.

Some results of pre-emergence weed control were demonstrated. Endothal had been applied at various rates—from too little to too much—in an effort to demonstrate the effectiveness of the chemical in destroying weeds while leaving beets unharmed. This experiment would have shown more spectacular results had not an excessive amount of water been applied by rain machine. But the results were significant—the photographs on the opposite page prove it.

Three thinning machines were demonstrated—Blackwelder, Eversman and Silver. Some of the plots had been thinned four days before the meeting, to show how the post-thinning stands appeared after recovery of the seedlings. During the demonstration, visitors had ample opportunity to watch the machines at work.

The performance of the various makes of thinner was more dependent on the condition of the beds before thinning than it was on the characteristics of the various makes. What this teaches is that the make of thinner is not as important to a good result as is the proper anticipation of mechanical thinning during all previous operations leading up to a pre-thinning stand.

HOW BEST TO PREPARE FOR OVERWINTERING BEETS

By S. S. ANDERSON, *Agricultural Superintendent*
Spreckels Sugar Company

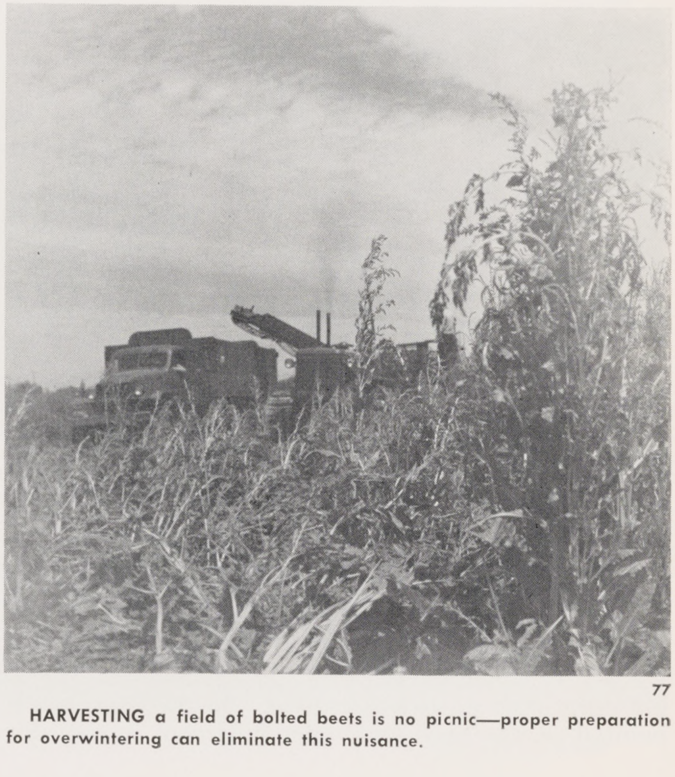
OVERWINTERING SUGAR BEETS is approaching its eleventh year in California and has proven to be a very successful venture in terms of increased yields through the winter months. Many crops verging on failure, or crops which would not yield enough to pay their way in the fall, have been carried over to spring and have been harvested as money makers.

To obtain large gains by overwintering a crop of sugar beets, careful planning must be done in advance. These gains do not come about by accident.

Factors to be considered in any plans are drainage, varieties, fertility level, irrigation, disease, insects and rodents.

DRAINAGE

First consideration in the selection of a field for overwintering a crop of beets is drainage. It should be of a fairly permeable soil and one that can be drained to keep excess water from standing in the furrows. The field should be so located that in the event of a flash flood the water can be drained off within a matter of two or three days. Some fields in the past have been submerged for a week at a time with no ill affects, but on the other hand, if temperatures of the water and soil are not low enough, some rot will occur. The degree of rot will be in proportion to the temperature and the length of time the crop is submerged. On rare occasions flooding has caused the total loss of a field.



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HARVESTING a field of bolted beets is no picnic—proper preparation for overwintering can eliminate this nuisance.

SEED VARIETY

Harvesting sugar beets in a field that has a high percentage of bolted beets is no picnic for either the grower or the processor. The seed stalks are difficult to avoid in the field, and equally hard to get rid of at the factory in the event some are hauled to the factory with the loads of beets. By using a non-bolting sugar beet variety, a two-week advantage can be attained as to the time of bolting (and degree of bolting) over some varieties which have a moderate amount of non-bolting characteristics. Consult your local field superintendent for advice on varieties to use for overwintering sugar beets.

FERTILITY AND WATER

Prepare your crop with enough fertility to carry it through the winter. If the fertility reaches a low point in late fall an additional amount should be added to carry it until spring. In determining the amount to use to assure fertility through the winter, keep in mind that in most soils there is an accumulation of nitrogen in the top of the bed from furrow irrigation that will be leached into the root zone by rain. Don't over load the crop with nitrogen; apply only enough to carry it until harvest in the spring.

One of the most common occurrences which will reduce the chances of increasing yields and sugar percent in the spring or in the summer is to let the field dry out in the fall. Irrigation should continue right up until the fall rains provide enough moisture for a growing crop, and to take advantage of the good growing months. A crop that is allowed to dry out and stop growing takes a long time to recover—whether in the summer or late fall.

DISEASES AND PESTS

Fields which have a large amount of Nematode or Sclerotium, or have any rot from any other cause, should not be overwintered because these beets will slowly deteriorate. Make sure the roots are sound and healthy before attempting this type of program.

Insects will cause no economic damage to a crop during the winter because they are at a dormant period in their life cycle.

Field mice or meadow mice can cause a lot of damage if they are not controlled. They will eat and hollow out the inside of a beet root and live in it throughout the winter. It is surprising how much they will eat and how fast their population increases. The fields should be checked weekly for these rodents. If the population is such that control is necessary, poison bait is an excellent control. Check with the local Agricultural Commissioner for a recommendation as to which type of bait is safe to use.

The discussion has dealt in terms of overwintering beets, but most of the factors can apply to beets grown through the normal season. Good farmer-like practices should be followed regardless of whether beets are harvested in the fall or are carried over winter for a spring harvest. Advanced planning is essential for any crop—particularly so for an overwintered sugar beet crop.

NEW HEADQUARTERS FOR BURTCH

LAUREN BURTCH, Agronomist in the Spreckels Sugar Company Agricultural Research Department is now in the process of transferring his home from Woodland to Fresno. While during his eight years in Woodland, Larry has been covering the entire Sacramento and San Joaquin Valley areas conducting variety tests, fertilizer trials, weed control plots and other research work.

Because of the distances involved in serving this large area it was felt advisable to move Larry's headquarters to a more central location to save him hours of driving time. At Fresno he will be able to spend more time on the important beet quality studies now being conducted by the company in the San Joaquin Valley. In addition, extensive trials toward finding optimum planting dates are underway.

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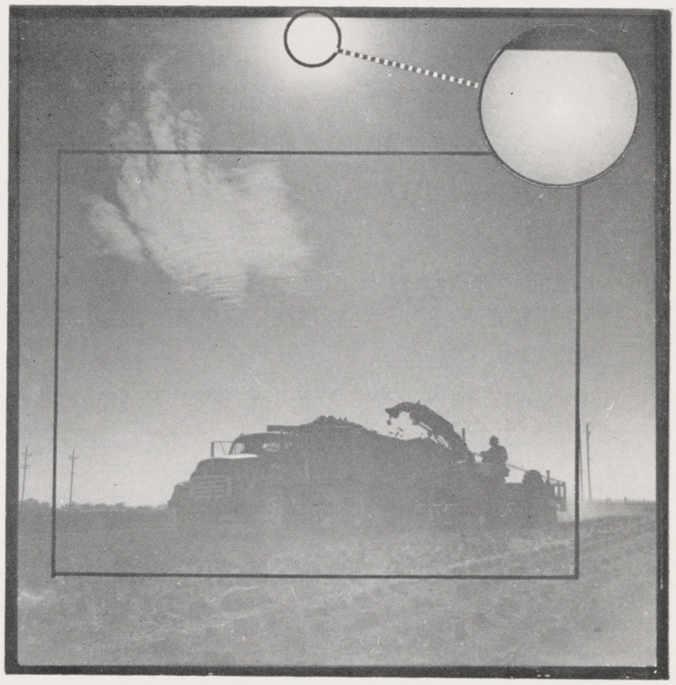
LAUREN BURTCH

The Sacramento Valley will continue to have research work done under Larry's general supervision and the company is now making plans to step up research in this area on sugar beet production.



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COVER PHOTO was cropped from original 2¼" x 2¼" negative, which included sun's image. Close examination showed sun in partial eclipse (enlarged inset). Checking with the newspapers proved the sun to have been in partial eclipse at 4:30 P.M., Sept. 20 — and that happened (entirely by accident) to be just when your editor snapped the beet harvester at work in Lloyd Eveland's field near Woodland.

LAND MANAGEMENT

(Continued from Page 38)

fallow, a clean fallow is an excellent rotation practice. The farmer-speculator of today, to make a profit, must compensate for the inertia of the government policy makers by giving himself a safe margin of earliness in land readiness.

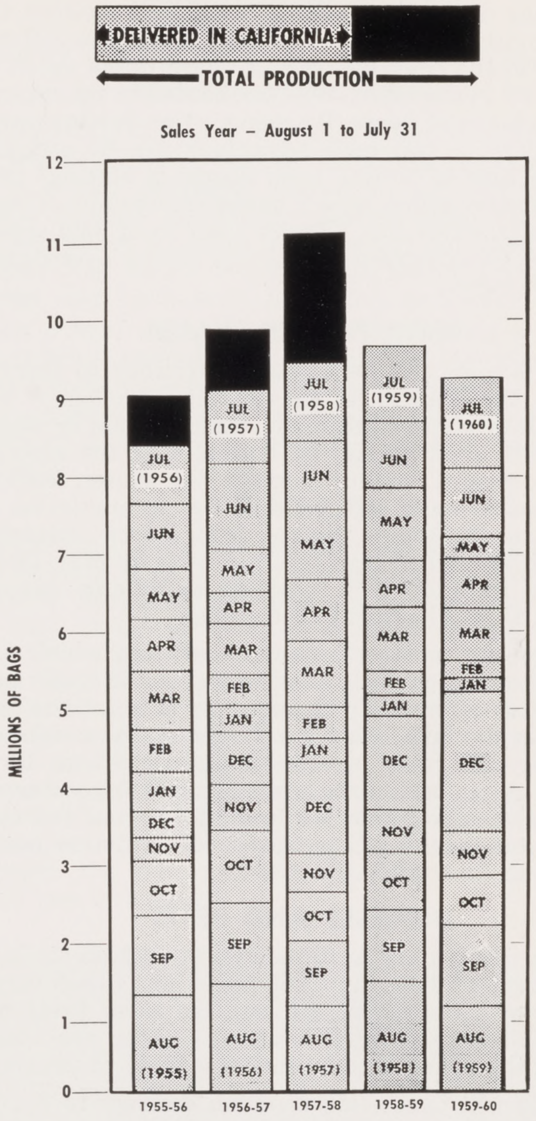
WATER MANAGEMENT

The fourth factor is water management. Here again the realistic manager will refer to the record book in planning for the forthcoming season. Record books are generally lacking in complete data concerning water. The amount of water applied per irrigation, and the total amounts of water used on a crop, are all too frequently absent. Dates of starting and stopping irrigations are valuable, but insufficient. The water quantity figures will be quite valid from year to year, whereas the dates of application are so liable to change that their intrinsic value is lost with the harvest of the crop. The past two "dry" years should have pointed out to many growers the value of maintaining accurate water-usage record. It is ironic that many California farmers are lax in planning their water requirements for each crop. The tendency is to turn the water on when it is needed and usually without much concern for wasted tail water until a short water year hits. The irony is that we do not capitalize on the principal advantage we have in California over many competitive agricultural regions, the availability of irrigation water, plus semi-predictable climatic conditions to take full advantage of our water.

Relating the subject of water management to land preparation in the San Joaquin Valley might be in order. Clean, weed free farming here in the San Joaquin Valley is much more of a problem than it is on the coast or in the Northern portion of the state. Due to the rotations which frequently include a close drilled grain crop, a clean-up of the land is essential prior to planting any row-crop. One means to achieve this clean up is pre-plant irrigation. The replenishing of submoisture and the sprouting of a crop of weeds is reason enough to warrant such an operation. Again timing of the post-harvest plowing or disking operations, enters the picture as a substantial determinant of the pre-plant irrigation.

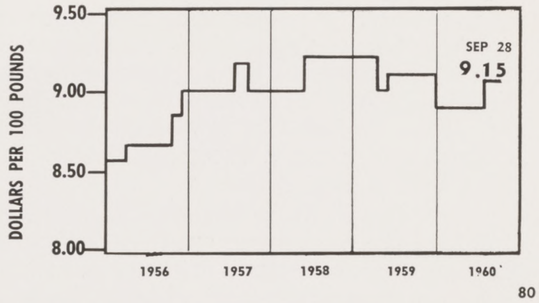
The four factors mentioned above are in reality only four aspects of the first move down the road to next year's crop. Specific discussions of types of equipment, ideal calendar dates for operations, proper plowing depths, etc., have been omitted. These items must be decided by the individual. But perhaps the individual choice will be more accurate after review of the factors in land preparation here outlined.

PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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The **SPRECKELS SUGAR BEET BULLETIN** is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers.
Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.
AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY
WOODLAND, CALIFORNIA

DEC 8 '60

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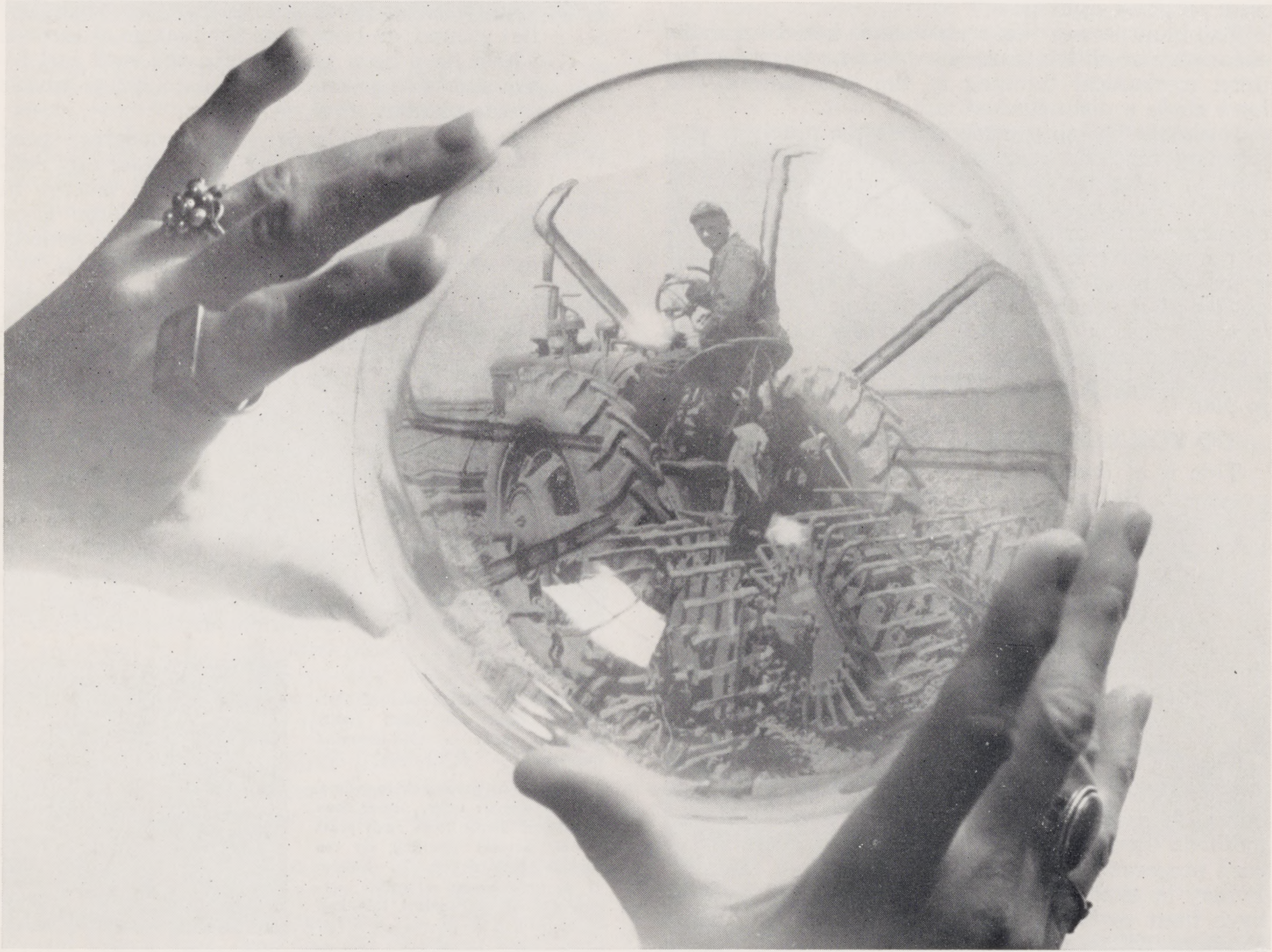

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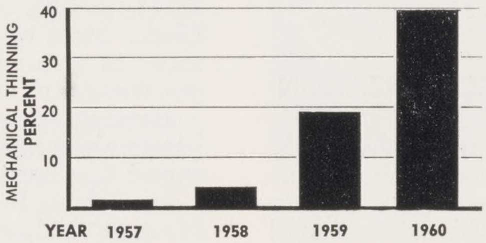
THERE'S A THINNER IN YOUR FUTURE

The trend toward mechanical thinning is decisive



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Successful mechanical thinning depends on a planned program of methods and machines. See page 46

PREPARE NOW FOR NEXT SPRING'S MACHINE-THINNING PROGRAM

By AUSTIN ARMER
Agricultural Engineer
Spreckels Sugar Company

WHEN YOUR BEETS are ready to thin in the spring of 1961, you may want to do the job mechanically. But you will not be able to unless you have started to make plans for your mechanical thinning program right now.

The bluntness of this statement is based upon the experience of all-too-many growers who have decided upon mechanical thinning at the last minute, and have made a distinguished failure of it.

It should be fairly evident that the purchase of a thinning machine requires some anticipation — the time to order a thinning machine from your implement dealer is not the day on which the plants attain the proper size for thinning. This is only one example of the need for anticipating a machine thinning program—there are other reasons which are not quite so obvious, but which are equally critical. The decision as to whether or not a spring mechanization program should be planned is up to the grower. If the decision is affirmative, we can give some suggestions as to how to plan it.

DO YOU WANT SPRING MECHANIZATION?

This is of course the first question that must be answered. Perhaps you are certain that you will have an abundant supply of labor next spring, and therefore have no reason to plan a mechanical thinning program. If you are absolutely positive that nothing will interfere with obtaining an expert crew of hand thinners at a bargain price, just forget about mechanical thinning. On the other hand, if there is any reason to doubt the availability of expert hand thinners in the spring of 1961, and if there is some merit in reducing the problems of labor procurement, then you will be interested in considering a program of mechanical thinning.

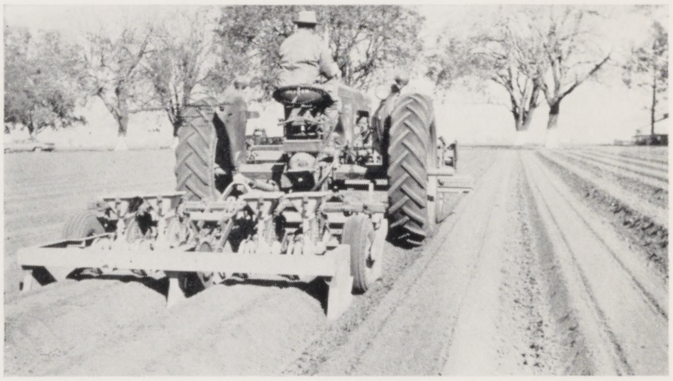
If you do decide on such a program for 1961, start out with a review of your present equipment and methods used in all of the springtime operations—land preparation, planting, cultivating and thinning. It may be that after your present accepted methods have been reviewed, you will find that mechanical thinning will fit very nicely—and that all you have to do is anticipate the purchase of a thinning machine so that it will be on hand when the seedlings are ready to be thinned.

On the other hand, it is far more likely that a considerable revision of present spring operations will be required to most profitably use a program of mechanical thinning.

HOW TO ANTICIPATE SPRING MECHANIZATION

In the September-October issue of Spreckels Sugar Beet Bulletin the article entitled "Spring Mechanization Demonstrated at Spreckels" stressed the importance of the right kind of planting job as an absolute requirement to successful thinning. This article should be referred to, but because it may not be available, the highlights will be repeated here. In order to produce a stand of seedlings suitable for mechanical thinning, the following conditions must be met:

1. The planted rows must be straight, and if they are on beds, they must be very accurately centered on the beds.
2. The planted field must be level, with no abrupt rise and fall in the beet rows. Specifically, the two rows on a single bed must at all times be at the same height.
3. The seedlings must emerge from the surface of flat ground, and not from the bottom of furrows which have been pushed into the seed bed by the excessive pressure applied to gauge wheels of the planter.
4. The planter must be driven at a moderate speed —not over four miles per hour under any conditions. Otherwise, the beets will emerge in clumps separated by dangerously large gaps. Uniform spacing between seedlings is absolutely essential to satisfactory machine thinning.



Fred Keiss photo

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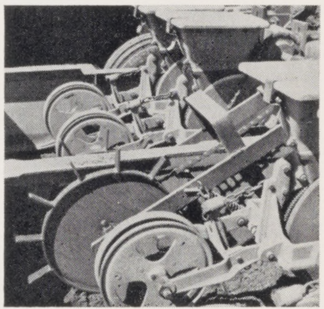

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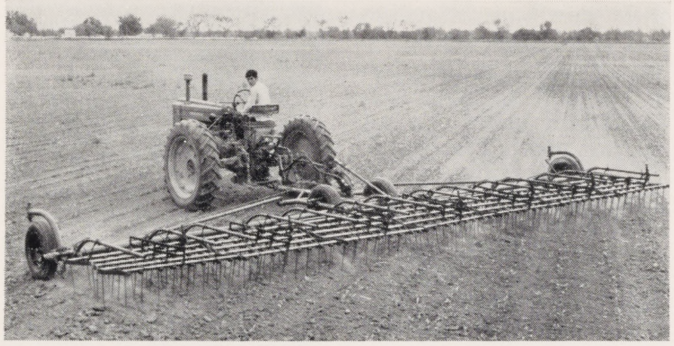
ABOVE—Straight rows of flat-topped beds are most easily achieved with a sled-mounted planter.

RIGHT—A ground-drive wheel for the planter units, rather than individual drives from each press wheel, permits planting on the surface instead of the bottom of a groove—an essential prerequisite to mechanical thinning.

WHAT TOOLS TO BUY

There are on the market three principal makes of blocker-type thinning machines—Blackwelder, Eversman and Silver. These are all down-the-row machines which remove a predetermined percentage of each block. Most of them also have provision for adjustment to give various block sizes, as well as various percentages of stand reduction.

However, there is a growing interest in spring tine harrows as a means of random stand reduction. These spring tine harrows can cover a very large acreage in a short time. If a program of random stand reduction is anticipated, such machines should be investigated.



Noble Manufacturing Company photo 85

SPRING TINE HARROWS are becoming increasingly popular—they are available from the old-line implement makers or from at least three specialty manufacturers. This is the Noble "Hydra-cart" harrow.

Spring tine harrows are available from almost every implement manufacturer.

The past experience with specific fields, especially with regard to the prospect of weeds, will determine very largely whether a spring tine harrow can be used either for a complete thinning job or as a useful addition to the work done by a down-the-row thinner.

SLEDS OR TOOL BARS?

A general purpose sled which can accommodate the bed shaper, planter, cultivating tools (and even down-the-row thinning units), has a great deal to recommend it for a program of total spring mechanization. However, it may involve more expense than is justified for the grower attempting spring mechanization for the first time. Consequently, it is important for the individual grower to weigh the merits of re-tooling on the basis of complete sled operation, or adapting his present tractor tool bar to the various steps of spring mechanization. This is a question which must be answered by the individual grower, bearing in mind that he will probably eventually adopt a complete program of sled operations in order to achieve the best all around job of spring work.

CHEMICAL WEED CONTROL

Some form of pre-emergence weed killer is becoming an important part of the spring mechanization program.

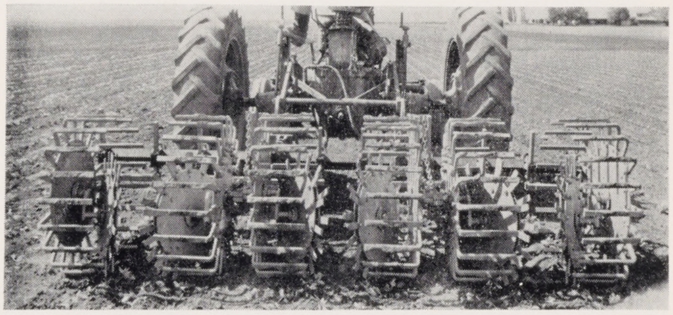
Endothal or TCA can be very effective, but there is still much to learn about the method of application. Hence the grower who is planning his spring program should take a long, hard look at chemical weed control. If he has used it in the past, he should review his experience to learn if possible, the factors which contributed to the success or failure of the application.

Consultation with other growers, with Farm Advisors or with commercial applicators is one way to multiply personal experience and to profit from the mistakes or successes of others.

THE TIMETABLE

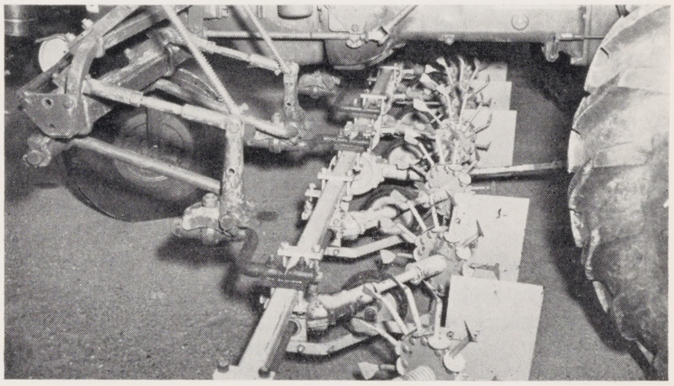
In working out a program of spring mechanization, it is of utmost importance to realize that every operation must actually be planned for and made ready many days before the date on which the operation takes place. It just won't work to go out into the field and discover that today is the time to cultivate or to use a spring tine harrow, or to start down-the-row thinning. It takes time to set up tools; it takes time to fit the job into other ranch operations which have their own demands on tractors and manpower. Consequently, the timetable relates not only to the beet crop itself, but to the beet crop in relation to other crops supervised by the same management.

In relation to the various suggestions which have been made, let it be emphasized that all of the suggestions relating to a mechanical thinning program lay stress on *anticipation.* That is the reason for mentioning at this time the steps toward a successful spring mechanization program which should be taken at once—now.



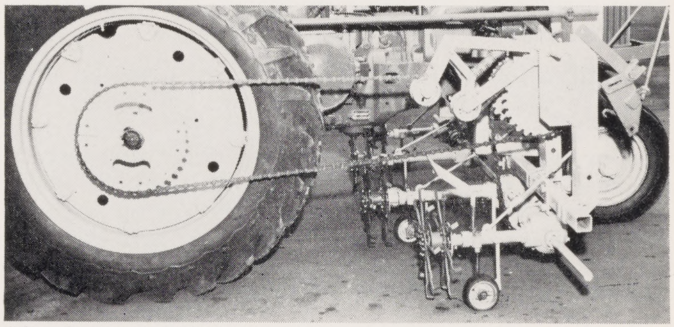
Blackwelder Manufacturing Co. photo 86

BLACKWELDER thinner units are show here, mounted on a tractor rear tool bar.



Eversman Manufacturing Co. photo 87

EVERSMAN thinner units can be mounted on a tractor tool bar (front or rear) or on a sled.



Silver Engineering Works, Inc. photo 88

SILVER thinner ("California Model") mounts on the front tool bar, or may be adapted to sled mounting.

WATER AND FERTILIZER— INTERRELATED FACTORS

By F. J. HILLS and R. S. LOOMIS [1]

OF THE MANY factors that enter into the production of a successful crop of sugar beets in California, the proper management of water and fertilizer are most frequently the ones that make or break a crop. This is true, not because things such as disease, insects and weeds are not equally important, but because *every* farmer *every* year has the problem of the judicious use of water and fertilizer, while he is not always faced with serious pest problems.

Water is the major constituent of plants during growth and development. When sugar beet leaves wilt, growth and sugar manufacture are inevitably reduced. A primary objective in water management is to keep plants from wilting. This is difficult to do under certain climatic conditions. A plant will wilt whenever the evaporative rate of water loss from leaves exceeds the rate of water intake through roots. Under very hot climates, beets may wilt for a short period during the day even though there is considerable soil moisture available to the plants. Such wilting cannot be avoided and the plants usually recover quickly as temperature and light intensity decline in late afternoon. Recovery will be much slower if available soil moisture is nearly depleted and growth may then be seriously reduced. Extended moisture stress, in addition to retarding root enlargement and leaf expansion, will hasten the death of old leaves which are needed to support future growth and sugar accumulation. If too many old leaves are lost from severe wilting, the plants will not recover to their maximum growth rate with the next irrigation until after they have grown new leaves to replace the dead ones.

The extent of wilting and the extent to which it can be combated by irrigation is a problem in water management. Lighter, more frequent irrigations during hot dry periods may be more effective than less frequent, heavier applications, particularly on sandy soils or soils with poor water penetration. On the other hand, under cool climatic conditions, deep-rooted sugar beets may be able to obtain ample water from depths of 3-6 feet even though soil moisture in the first foot or two is low.

Fertilization in California, for most growers, boils down to the questions of what, how, how much, and when? In general the answer to "what?" is—nitrogen and/or phosphorous. The grower determines which of these (or other) essential plant nutrients he needs by appropriate soil or plant tissue tests or by fertilizer trials. "How much?" is answered by plant analysis, fertilizer trials and experience. Answers to the questions "when" and "how" will depend on the "when" and "how" of irrigation. But before discussing the importance of fertilization in relation to irrigation, we should make one important point. *The best irrigation practices can do little to produce a profitable crop if the plants are seriously deficient in any of the nutrients essential to growth. Likewise, keeping beets well supplied with essential nutrients will do little good if the crop suffers repeatedly from lack of water.* In other words, the chain is no stronger than its weakest link!

5000 PPM
NO$_3$-N
WHEW!
I'VE ENOUGH NITROGEN NOW— BUT I SURE COULD USE A DRINK!

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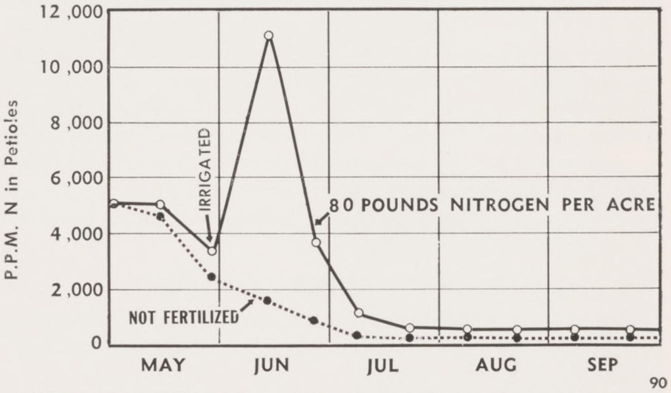
BEETS SUFFER from lack of moisture; providing ample nutrients does no good unless soil-moisture can make them available.

THE WATER-FERTILITY PARTNERSHIP

Now let's consider some important ways in which soil moisture and fertility are interrelated. Plants cannot absorb nutrients readily from a dry soil. Thus, there must be moisture available in the same soil layers that contain the supply of available nutrients. This is an important consideration where fertilizer is applied as a sidedressing or where beets are sub-irrigated (See graph below). Sidedressed fertilizer is frequently not absorbed by sugar beets until after irrigation has supplied enough moisture to move the fertilizer into the root zone or allowed the plant roots to grow into the fertilizer band. With ammonium forms of nitrogen, in some cases, it may take two irrigations before the plants respond to the applied nitrogen. The first irrigation supplies sufficient moisture to allow soil micro-organisms to convert ammonium nitrogen to the more mobile nitrate form and the second irrigation moves the nitrate into the root zone. With sub-irrigation, beets will frequently have a sufficient moisture supply from an infertile subsoil, but because the surface soil is too dry, will be unable to absorb sufficient nutrients from this area even



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WATER IS NECESSARY for uptake of nutrients by plants. These sugar beets absorbed little Nitrogen from side-dressed ammonium nitrate until after they were irrigated at the end of May. (Data redrawn from Ulrich, A.—Proceedings AM. Soc. Sugar Beet Technologists).

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[1] Extension Agronomist and Assistant Agronomist, respectively, University of California, Davis.

though it may contain applied fertilizer. Under such conditions, it may be wise to surface irrigate.

In soils readily permeable to water, such as a sandy soil, and with high rainfall or excessive irrigation, some nutrients may be leached beyond the depth of rooting. It may be better to fertilize two or three times during the growing season than to apply all the necessary fertilizer in a single early application. Leaching losses can be controlled by carefully regulating the amount of water applied. With heavier soil, where leaching may not be a problem, a single early application of fertilizer is desirable.

TONNAGE AND SUGAR CONTENT

Thus far, we have discussed how fertility and moisture influence vegetative growth. Our present knowledge may be summarized by saying that any nutrient or moisture stresses during the growing season will have detrimental effects on beet root yields. As harvest time approaches, root quality, primarily in terms of sugar percent, becomes an important factor. In general, environmental conditions which retard growth without interfering with sugar manufacture by leaves, will bring about higher sugar percentages in beet roots. Cold weather with high light intensity will do part of the job, and we try to arrange harvests to correspond with such conditions. Nitrogen deficiency is extremely effective in increasing sugar percent in beet roots. The degree of deficiency which can be developed in the crop depends upon how much nitrogen is being released to the plants through decay of soil organic matter, and how rapidly the crop is using nitrogen. These two factors, both of which are influenced by climate, determine the optimum length of the preharvest period of nitrogen deficiency. Some examples will illustrate this: In cool climate and with fertile soils, severe nitrogen deficiencies seldom occur. Beets with yellow leaves, and other nitrogen deficiency symptoms, will continue to make good growth while also increasing sugar percent. Sixty to ninety days of such nitrogen deficiency prior to harvest is not too long in some areas. Yields of sugar will be equal or greater than from similar fields kept high in nitrogen where larger yields of roots at a low sugar percent would be obtained. With more severe deficiencies sugar yields would be reduced by such an extended period of nitrogen deficiency—40 to 60 days would be nearer the optimum. In hot climates, severe deficiencies may cause rapid loss of leaves and the deficient period should be relatively short — say 30 days. Hot climates also cause lower sugar percentages, not easily altered by nitrogen deficiency.

The use of moisture stress to retard growth and thus "ripen" the beet is not as well understood. It appears that in cool weather, moderate moisture stress prior to harvest may improve quality. In hot climates, irrigation should be provided to within a few weeks (2-3) of harvest. In no case should the crop be allowed to wilt so badly it does not recover quickly in the evening or so that wilting occurs before midday. Sugar percent may be increased by extreme soil moisture stress, but generally it is due to a loss of water from the root; i.e., a decrease in root weight rather than from an increase in the total amount of sugar in the root.

SUGAR BEET ACREAGE—1961 CROP

By G. D. MANUEL
Vice President, Spreckels Sugar Company

WHEN THE GOVERNMENT announced that acreage restrictions would be withdrawn on the 1961 sugar beet crop, many growers believed that a large increase in acreage was about to occur in California. The same belief prevailed in other states as well. Now that time has allowed a survey of the actual situation, it is apparent that there cannot be a large expansion in beet sugar production in California nor in the United States as a whole. Estimates range between 10 and 15 percent for the increase in production over the 1960 crop, which amounted to a million acres for the United States and about 217,000 acres for California.

The reason only a modest increase in acreage is possible is the limited amount of factory capacity available to handle the beet crop. The beet sugar industry has grown rapidly in the past several years, increasing its production from 1,800,000 tons to an estimated 2,400,000 tons of sugar with the 1960 crop. A major portion of the increase has come about through the deficits in production in Hawaii and in Puerto Rico and through the growth factor written into the present Sugar Act. Because no one could foresee the deficits that have arisen in these other areas, factory capacity has increased only through technological improvements and not through construction of new facilities. The industry now finds itself in the position of having factory capacity the limiting factor in the acreages that it can handle. This is true of the Spreckels Sugar Company and most of the other sugar companies in this country. Major expansion of facilities requires more assurance than merely depending on the continuation of these deficits from other areas. It is extremely difficult to plan on new plant facilities under present circumstances and will continue to be until new legislation has been written.

Spreckels will contract somewhat larger acreages in 1961 on the basis that it can operate its factories more days during the year. To accomplish this means that growers must harvest during periods when they have not been harvesting in the past. In most instances this scheduling of production is not adaptable to many of our growing areas. The company is therefore accepting additional acreage and some new growers in the southern part of the San Joaquin Valley where a satisfactory crop can be grown for early harvest. The new acreage is being contracted with the understanding that it will be harvested starting the latter part of June and continuing into early August.

We believe it is important to maintain California's position in the beet sugar industry. It is likewise important for Spreckels to continue marketing sugar at high levels to protect our future marketing allotments. By extending the harvest period with early harvest commencing in late June, we can increase total sugar production without interfering with the normal harvest. However, we are contracting for a maximum acreage in 1961, and should an above average crop be experienced, a longer spring campaign can be anticipated. With an average crop we do not expect any unusual harvest problems.

Despite the fact that acreage restrictions have been lifted, growers are cautioned that the other requirements of the Act are still in force. Accordingly, growers should comply with the provisions of the Act as they have in previous years.

MANTECA FACTORY IS HOST AT 4-H SUGAR BEET FIELD DAY

CLOUDY SKIES and occasional drizzles failed to dampen the spirits of some 103 youngsters who descended on Manteca to participate in the fourth Sugar Beet Field Day.

Representing five counties—Solano, Fresno, Stanislaus, Merced, and San Joaquin—the young sugar beet growers were joined by 4-H Club leaders, parents and Extension Service Farm Advisors in the annual event that climaxes several months of work and study.

One of the highlights of the day's festivities was the awarding of sugar processed from the beets the youngsters themselves have grown. Also on the agenda was a tour of the factory at Manteca, and a luncheon in honor of the 4-H Clubbers.

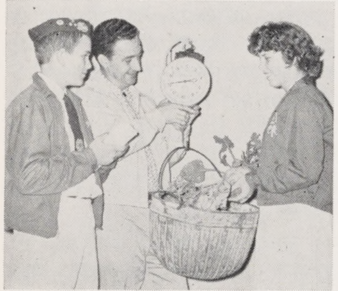
The over-all 4-H Club sugar beet program was developed by the Agricultural Extension Service at the University of California in cooperation with Spreckels Sugar Company.

Each boy and girl taking part in the project planted a plot of sugar beets in his back yard. Plots for beginners averaged 150 square feet, those for advanced members 450 square feet.

While carrying the crops to maturity, the youthful growers visited commercial farms, viewed slides and films about sugar beets, and received instructions on sugar beet culture.

A short time ago the crops were harvested. Yields were carefully recorded and laboratory samples were taken to determine sugar content for each crop.

The beets were then processed at the Spreckels factory at Manteca so that the appropriate amounts of sugar could be returned to each participant during the Field Day ceremonies.



Western Beet Sugar Producers photos

ROSWELL (ROS) ROBERTS, Stanislaus County 4-H Club Farm Advisor, holds the scales while Jeannie Moe, 13, weighs in part of her crop of sugar beets. Helping keep track of the total is Glen Crow, 12.

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RON KNIGHT, Solano County 4-H Club Farm Advisor, holds the scales while Jerry Cohen, 10, weighs in his sugar beets. Darsie Broughton, 13, tallies the weights.

JAMES FULMOR REPORTS ON TRIP THROUGH RUSSIA

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FULMOR and friends in Kiev

JAMES FULMOR is a dairyman and field crop grower. He operates a 560 acre ranch near Dixon, and over the past 35 years he has built this ranch into one of the local area show places.

Jim has just returned from a trip through Russia, travelling almost from the north to the south border, and spending most of his time in the Ukraine where he made some close observations on Russian farming methods.

Jim reports that there are two principal types of farm in the USSR—the collective and the state-operated farm.

COLLECTIVES AND STATE FARMS

The present day collective farm was formerly a village where each farmer tended his own acres. Now they operate on a cooperative basis under the direction of the Government, being told what crops to raise, acres to be planted, and the price they will receive on delivery of their crop.

Collective farmers work harder than employees on a state-operated farm because the rewards of extra effort accrue to the cooperative.

Supervision on these collective farms is less intense; hence more decisions are made on the collective farm. As a rule each member has a garden spot; they keep a few chickens and occasionally one finds a family car. All the land in Russia is owned by the Government.

The state farm is operated in a manner comparable to the large corporate farm operations in this country, except that the owner of the entire operation is the Government. All persons working on the farm are Government employees on regular salaries and working regular hours.

The USSR has approximately seven million acres of sugar beets. However, the yields are very low in comparison to this country—averaging between 6 and 7 tons per acre. Thus Russia produces over twice the number of tons of beets as does the United States, where there are approximately one million acres with an average yield of close to 19 tons per acre.

The Russian beet fields are very clean and well cared for, because there is an almost unlimited labor supply. Furthermore, the majority of the fields are not irrigated, and this favors clean fields free from weeds. The size of individual fields is striking—1,000 acre fields are not uncommon.

Mechanization is limited to partial use of harvesters. These machines, the name of which Mr. Fulmor did not obtain, are apparently designed from a Czechoslovakian prototype. They are three-row machines involving a series of chains provided with gripping fingers which grasp the beets by the tops as they are lifted by conventional plow shares. These gripper-chains then carry the untopped beets past a pair of topping discs, dropping the beets into one hopper and the tops into another. From these hoppers the beets and tops are dropped into alternate windrows. Another model delivers beets to a following truck.

The machines which Jim saw in operation were not set up to top—they were merely digging the beets and dropping them in stacks. Groups of women would then descend upon one of the stacks with butcher knives, top the beets, put the tops in one stack and the roots in another. The quality of their topping was virtually perfect—they took as much time as necessary—not only to slice off the top — but also to trim off the crowns just as we would do in our factory tare laboratories.

FARM LABOR IS PLENTIFUL

The abundance of farm labor which was everywhere in evidence is a reflection of the fact that about 25% of Russia's population is engaged in agriculture (9% of the U. S. population is on the farm).

Management practices on both the collective and the state farms appeared to be good insofar as rotation was concerned, but there seemed to be some lack of fertilizing as evidenced by the relatively low yields of field crops. Sugar beets in the Ukraine dry-farmed areas are rotated with vetch, oats, corn (for silage), clover or alfalfa. This rotation was observed by Jim on a 1500 acre collective.

In his visits to the cities, Jim noticed a marked improvement in the apparent standard of living in comparison to reports of five to ten years ago. This is particularly noticeable in the shoes, clothes and wheel toys of the children. The teen-agers and young adults were also well dressed and apparently well fed, but the middle aged and older people did not appear to share in this improvement in shoes and clothes.

INCOME VARIES

The income of workers is extremely variable. Contrary to what might be expected in a socialized economy, there is a tremendous difference in wages and salaries depending on the nature of work and apparently on the influence brought to bear on those responsible for setting wages. Jim reports that he talked to a highway engineer, whose job was comparable to a resident civil engineer on one of our highway projects. He was receiving 1,000 rubles per month, while his wife also worked as a technician, maintaining motion picture projection equipment. Her salary was 750 rubles per month. Thus their combined income was 1,750 rubles per month which is equivalent (on international exchange) of $437.50 per month for the

(Continued on page 52)

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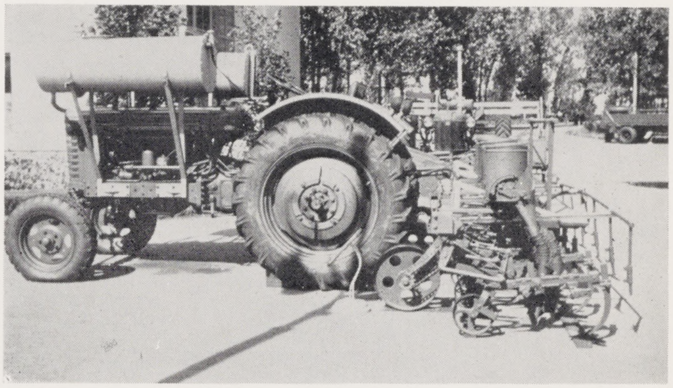
PETR JAKOVLEVICH TATJANCHENKO (left) is administrator of a 1,500 acre collective farm which Jim visited.



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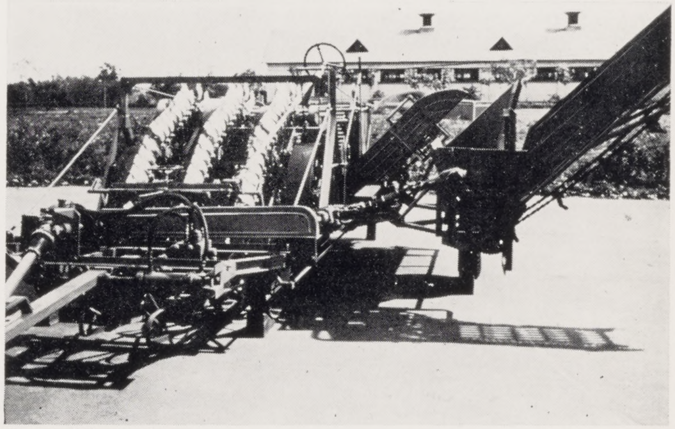
PLANTER, with liquid fertilizer or weedicide applicator was on permanent exhibition at the Kharkov Agricultural Fair. (Is the tractor familiar?)



James Fulmor photos

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BEET HARVESTER digs 3 rows; has disc toppers and elevator. On exhibition at the Kharkov Agricultural Fair.

REPORT ON RUSSIA

(Continued from page 51)

couple. However, in actual purchasing power of food, clothing and shelter, this represents somewhat less than half what the same figure would buy in the United States.*

A more realistic appraisal of the purchasing power of the American and Russian worker is obtained by comparing the purchasing power of the man hour of work in each country. Bear in mind that the comparisons listed below are based on an average Moscow worker's salary—certain professions, specifically scientists in physics and chemistry, may receive more salary in terms of actual buying power than would men with equivalent positions in the United States.

U. S. PRICES COMPARED TO U.S.S.R. PRICES*

(Based on median wages prevailing in New York City and Moscow, August, 1959)

Item	Time worked New York	 Moscow	Ratio— Moscow to New York
Sugar, 1 lb.	3 min.	64 min.	21 times
Shirt, men's cotton	.93 hr.	15 hrs.	16 times
Dress, Rayon street	4.6 hrs.	73.5 hrs.	16 times
Suit, men's wool	23 hrs.	275 hrs.	11 times
Shoes, women's	5.2 hrs.	57.5 hrs.	11 times
Butter, 1 lb.	0.35 hr.	3.07 hrs.	9 times
Eggs, 1 doz.	0.28 hr.	2.40 hrs.	8½ times
Beef, roast	0.35 hr.	1.37 hrs.	4 times
Milk, 1 quart	8 min.	31 min.	4 times
Potatoes, 1 lb.	2 min.	7 min.	3½ times

*Reported by Edmund Nash, U. S. Bureau of Labor Statistics.

In summing up his experiences, Jim says that there can be no doubt that Russia's rate of progress in making consumer goods available and improving the general standard of living is very marked in comparison to what it was after the war. But they have a long long way to go, and have only reached the point of providing what we would consider the bare necessities of life—a modern but crowded apartment, an adequate but simple diet, and a wardrobe suitable to the relatively austere style customs prevailing.

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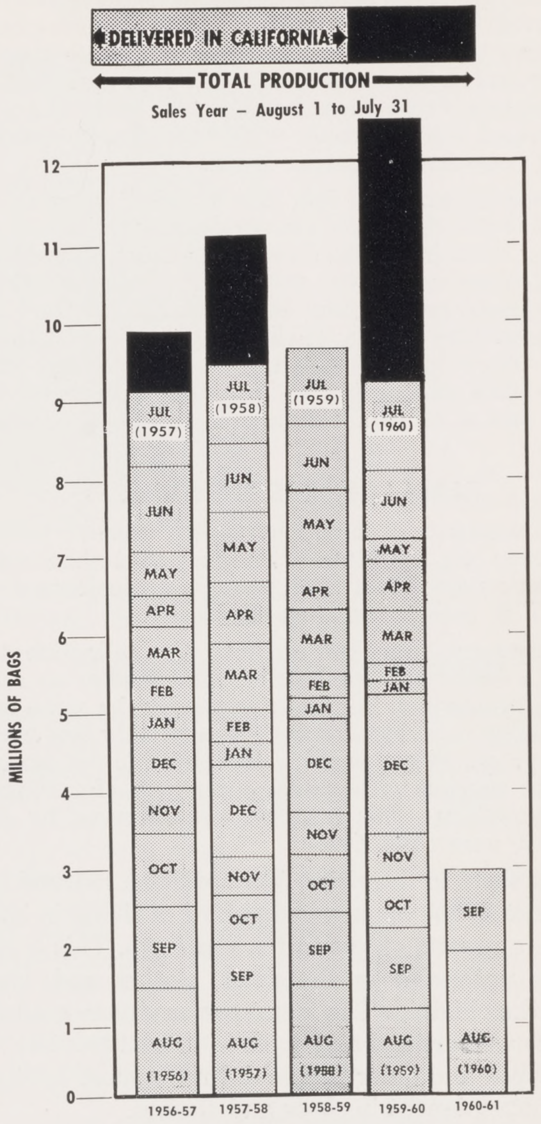
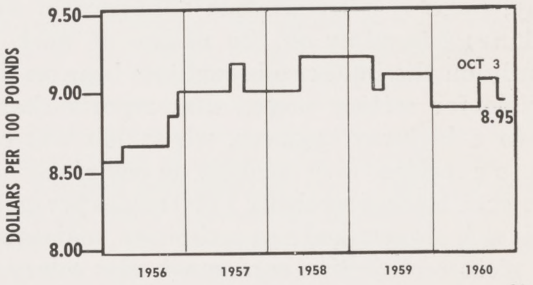
*On Nov. 14, 1960 the ruble was revalued at $1.00 instead of $.25. However, Russian news reports claim that this would not affect the Russian worker's purchasing power.—Ed.

PRODUCTION AND DELIVERIES OF BEET SUGAR IN CALIFORNIA



QUOTED PRICE OF BEET GRANULATED SUGAR

In 100 Lb. Paper Bags, F.O.B. San Francisco



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The **SPRECKELS SUGAR BEET BULLETIN** is issued bi-monthly by the Agricultural Department of the Spreckels Sugar Company as a service to its growers.
Mention of specific methods, devices and implements does not constitute an endorsement by the Company.
All photographs by the editor unless otherwise indicated.
AUSTIN ARMER, EDITOR
SPRECKELS SUGAR COMPANY
WOODLAND, CALIFORNIA

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